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HYPERTENSION OF RENAL ORIGIN IN RATS FOLLOWING LESS THAN ONE WEEK OF CHOLINE DEFICIENCY IN EARLY LIFE*

BY

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[WITH PHOTOGRAVURE PLATE]

The production of arterial hypertension by dietary deficiency alone has not previously been demonstrated. Since the report by Griffith and Wade (1939) it has been well established that choline deficiency produces severe renal lesions in young rats (György and Goldblatt, 1940 ; Engel and Salmon, 1941 ; Handler, 1946 ; and others). A careful study of the blood pressures of rats maintained for long periods on diets low in choline has been made by Sobin and Landis (1947), who found no evidence of hypertension. The results of earlier studies by Honorato and Vadillo (1944) apparently support this same conclusion. Stimulated in part by these papers, by discussions with Professor Eugene Landis, and by the early studies of choline deficiency in our laboratories (Best and Huntsman, 1932), we decided to produce a severe renal lesion by this dietary means and then to study the blood pressures of the surviving animals maintained on full diets. Under these conditions, in our present series of observations all animals with severe residual renal damage developed hypertension. The average figure for ten animals in this group was 195 mm. Hg. This is the mean pressure recorded by arterial cannulation. The comparable figure for 36 control animals was 118 mm. Hg.

Methods

Weanling albino rats of the Wistar strain weighing 35–42 g. were fed a diet low in choline (T45) as described by our colleagues Lucas and Ridout (1948). The object was to produce the greatest degree of renal damage compatible with life. The animals were fed the choline-deficient diets for varying lengths of time. Most of the rats received the ration for five to six days. In the more recent experiments the animals were fed the choline-deficient diet for four five-day periods separated by two-day intervals during which the diet was supplemented with 0.35% choline chloride. All the animals received a stock diet for the remainder of the experiment. In the early studies the rats were sacrificed at the age of 3 to 4 months, but it was subsequently discovered that a higher percentage developed hypertension if allowed to live for six or seven months. Control animals were pair-fed with those receiving the choline-deficient diet. These controls received the T45 diet supplemented with 0.35% choline chloride. They were given the stock diet *ad libitum* at the same time as the experimental groups, and were maintained on this until sacrificed.

Indirect blood-pressure determinations according to the method of Sobin (1946) were made at intervals on all rats in order to follow the progress of the experiment. At the end of the period of observation blood-pressure determinations were made by the direct procedure. The animals were anaesthetized with 90 mg. of sodium amytal per kilogram of body weight, administered intraperitoneally as a freshly prepared 10% solution in distilled water. The femoral artery was exposed and cannulated with a 24-gauge needle. Drops of 1% aqueous solution of procaine hydrochloride were placed on the artery during dissection to prevent spasm. The needle was attached to a fine-bore mercury manometer, and the system filled with Ringer's solution. Owing to the inertia of the system the readings obtained represented the mean of systolic and diastolic levels of blood pressure, and all direct blood-pressure measurements reported in this paper refer to this mean value rather than to systolic levels. The animals were killed by exsanguination. This procedure effectively emptied the hearts, which were weighed to the nearest 1/100 g., and these figures are expressed in the tables as percentages of the total body weights. In all but the earliest experiments, in order to obtain the greatest possible objectivity, the observations concerning blood pressure and heart weights were made without the observer (W.S.H.) knowing whether the animal belonged to the control or to the experimental group.

Paraffin sections of the viscera were made after fixation in either 10% neutral formol-saline or in Bouin's solution. Sections were treated with haematoxylin and eosin, Mallory's phosphotungstic acid haematoxylin (P.T.A.), Gomori's chromium haematoxylin and phloxine, and Masson's connective-tissue stain. In addition selected sections were stained for elastic tissue, for calcium, and for haemosiderin. Frozen sections of kidneys and large vessels were stained for fat and tested for cholesterol (Schultz reaction). Several sections from both kidneys of each animal were surveyed and the amount of renal damage classified as severe, moderate, or slight.

Observations were made on 62 rats surviving varying degrees of the renal haemorrhagic syndrome and on 36 control animals of similar age and weight.

Results

The findings in the experimental animals (Tables I–III) were divided into three groups according to the degree of

*These histological studies were aided by a grant from the National Research Council of Canada, 1948, and the nutritional aspects of the work were financed in part by the Nutrition Foundation in New York.

residual renal damage noted microscopically. Group 1 (Table I) is made up of the 10 survivors of the haemorrhagic renal syndrome which had *severe* persistent kidney damage. All these animals had definite arterial hypertension. The average blood pressure was 195 mm. Hg and the average weight of their hearts was nearly double the normal value. Group 2 (Table II) comprises the 13 survivors of the acute

TABLE I.—*Heart Weights and Blood Pressure (Determined by Direct Measurement) in 10 Rats Surviving Haemorrhagic Kidney with Severe Degrees of Residual Renal Damage*

Animal No.	Heart Weight Percentage of Body Weight	Blood Pressure (Systolic–Diastolic Mean) (mm. Hg)
HJCa–737	0·64	230
HJO–448	0·57	210
HRCc–704	0·51	200
HJCb–747	0·50	200
HRCc–712	0·43	200
HRCO–530	0·88	200
HRCb–570	0·40	196
HJCb–752	0·66	180
HRCB–535	0·43	179
HRCO–518	0·48	150
Average	0·55	195

TABLE II.—*Heart Weights and Blood Pressures in 13 Rats Surviving Haemorrhagic Kidney with Moderate Degrees of Residual Renal Damage*

Animal No.	Heart Weight Percentage of Body Weight	Blood Pressure (Systolic–Diastolic Mean) (mm. Hg)
HJCa–746	0·40	200
HFB–105	0·40	195
HRCB–560	0·37	170
HJCa–744	0·40	170
HJCa–739	0·34	170
HRCb–552	0·34	165
HRCc–710	0·32	170
HRCc–711	0·35	160
HJCa–742	0·41	160
HJCa–743	0·37	160
AK–304	0·44	150
HJCa–759	0·35	140
HRC(c)–709	0·31	130
Average	0·37	165

TABLE III.—*Heart Weights and Blood Pressures in 39 Rats Surviving Haemorrhagic Kidney with Slight Degrees of Residual Renal Damage*

Animal No.	Heart Weight Percentage of Body Weight	Blood Pressure (Systolic–Diastolic Mean) (mm. Hg.)
HRCO–524	0·35	150
HRCO–522	0·34	130
HJO–416	0·33	153
HJB–467	0·32	158
HRCO–514	0·32	140
HRCO–519	0·31	150
HJO–405	0·31	120
AK–308	0·37	140
AK–303	0·41	150
HJO–424	0·39	140
HRCB–562	0·38	130
HRCO–503	0·38	130
HRCO–508	0·37	120
HFB–109·1	0·37	140
HRCO–512	0·36	140
AK–325	0·36	125
HRCO–521	0·35	135
HRCB–564	0·34	130
HJB–475	0·32	158
HJO–442	0·30	145
HJB–479	0·28	142
HJB–480	0·34	110
HJB–484	0·30	130
HJB–486	0·30	130
HRCO–507	0·29	125
HRCO–510	0·33	130
HRCO–513	0·30	120
HRCC–703	0·30	130
HRCC–713	0·31	160
HRCC–716	0·32	130
HRCC–717	0·34	160
HJCa–740	0·33	90
HJCb–749	0·31	160
HJCb–750	0·31	130
HJCb–751	0·35	185
HJCb–753	0·32	130
HJCb–756	0·31	140
HJCb–757	0·31	130
HJCb–758	0·30	100
Average	0·33	136

TABLE IV.—*Heart Weights and Blood Pressures in 36 Normal Control Rats Fed Diets Containing Choline*

Animal No.	Heart Weight Percentage of Body Weight	Blood Pressure (Systolic–Diastolic Mean) (mm. Hg)
A	0·33	110
B	0·30	100
C	0·32	115
D	0·32	130
E	0·30	130
K–1	0·34	100
L–1	0·30	105
M–1	0·33	130
N–1	0·30	130
O–1	0·32	110
P–1	0·35	130
A–2	0·30	130
B–2	0·28	140
C–2	0·30	135
I	0·26	120
J	0·30	130
HRCC–726	0·34	80
HRCC–727	0·30	82
HRCC–728	0·29	120
HRCC–729	0·32	170
HRCC–730	0·27	120
HRCC–731	0·28	120
HRCC–732	0·25	100
HRCC–733	0·27	130
HRCC–734	0·27	100
HRCC–735	0·26	130
HJCa–761	0·28	120
HJCa–762	0·31	110
HJCa–763	0·30	120
HJCa–764	0·31	135
HJCb–766	0·30	120
HJCb–767	0·29	125
HJCb–768	0·27	130
HJCb–769	0·26	90
HJCb–770	0·32	85
HJCA–765	0·30	130
Average	0·28	118

period of choline deficiency with *moderate* residual renal damage. Of these, 85% (11 of 13) had blood pressures of 150 mm. Hg or over. The average blood pressure for this group was 165 mm. Hg, and the average heart weight was one-third greater than that of the normal controls (Table IV). In the remaining 39 survivors (Group 3) only *slight* renal damage was found. There is little evidence that a significant degree of hypertension developed in the members of this group (Table III). Of 36 *control* animals of similar age and weight, only one had a blood pressure greater than 140 mm. Hg, and the average for the group was 118 mm. Hg (Table IV).

The kidney lesions took the form of tubular destruction combined with marked distension of other nephrons, many of which contained large amounts of eosinophilic colloid, particularly in the medulla. There was obvious reduction in the number of glomeruli in the severely damaged kidneys (Figs. 9 and 10), and the remaining glomeruli showed severe

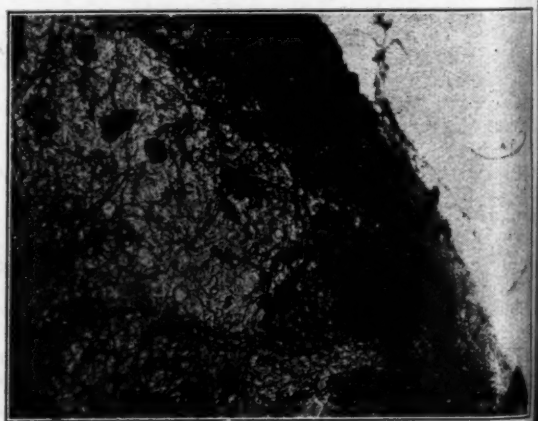

FIG. 9.—Thick (100 μ) section of kidney of an animal with severe residual renal damage following a short period of choline deficiency when a weanling. The vessels have been injected with indian ink and tissue cleared in benzyl benzoate. Note the scarcity of glomeruli. (×50.)

degrees of thickening of the basement membranes throughout the capillary loops, while others were converted into little more than spheres of hyaline material. Fig. 1 (Photogravure Plate) illustrates the type and degree of kidney damage classified as severe. Figs. 3 and 5 present examples of kidney lesions classified as moderate and slight respectively.

The vascular lesions varied from early cellular proliferation of the media and adventitia of the arterioles (Fig. 6) in animals with only slight kidney damage and slight evidence of hypertension, to intimal hyalinization (Fig. 4) and fibrinoid necrosis (Fig. 2) in those with severe degrees of kidney damage and elevated blood pressure. Determinations of the non-protein nitrogen levels in the blood of two such animals showed values over 350 mg. per 100 ml. Photomicrographs of the kidney and a representative arteriole from a normal control animal are given for comparison (Figs. 7 and 8). No gross or microscopical evidence of atheromatous deposits was found in the larger arteries, nor could elastosis (Boyd, 1947) be demonstrated in these. Small deposits of cholesterol (Schultz-positive) in some of the hyalinized glomeruli were demonstrated in frozen sections of the most severely damaged kidneys. No evidence of inflammatory disease was found in any of the sections of hearts of the hypertensive animals.

Discussion

Reduction of the glomerular capillary bed incident to the kidney damage resulting from the deficiency of choline appears to be the significant factor determining the degree of hypertension eventually produced (Figs. 9 and 10). As these renal lesions are primarily tubular (Christensen, 1942; Hartroft, 1948) it may at first appear paradoxical that glomerular damage is such a prominent feature of the lesions in the surviving animals. However, these authors and others have pointed out that in severe cases of haemorrhagic kidney the glomeruli are secondarily involved in the later stages of the syndrome. When appreciable numbers of glomeruli are destroyed a train of events is apparently started leading to elevation of blood pressure. The hypertension in turn produces thickening of both the glomerular loops and the arterioles. It is likely that the mechanism producing hypertension in our animals is similar to that operating in rats after subtotal nephrectomy (Chanutin and Ferris, 1932). In the present experiments the factor responsible for reducing the amount of functioning renal tissue is dietary deficiency rather than surgery. The basic mechanisms by which hypertension is initiated are probably similar to those demonstrated by Goldblatt *et al.* (1934). The effects of massive amounts of vitamin D in producing evidences of hypertension (Ham, 1940) are presumably exerted through similar pathways.

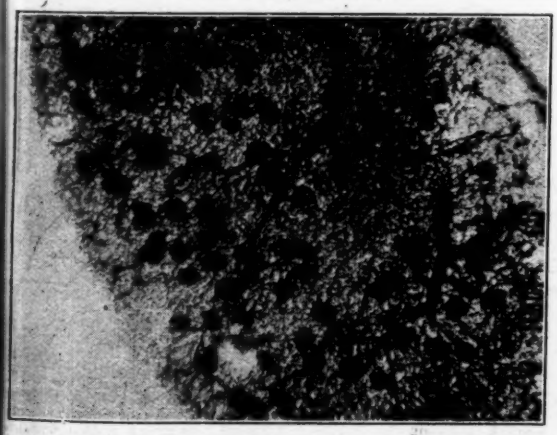

FIG. 10.—Comparable preparation to that shown in Fig. 9, from a normal control rat of similar age and weight. Note the large number of glomeruli. (×50.)

It is well known that there is great variation among the members of any group of young rats in the extent of renal damage resulting from choline deficiency. A small percentage of such animals never develop advanced renal lesions even if fed the diet for many weeks. In the early stages of the experiments here reported large numbers of weanlings were left on the choline-deficient diet for periods as long as 7 to 10 days. The mortality rates in these groups were high (over 80%). The small number of survivors were then given full diets, but appreciable residual renal damage was not present at necropsy several months later, and blood-pressure values during life were not significantly higher than normal levels. This finding indicated to us that a prolongation of the period of dietary deficiency had eliminated those animals most susceptible to this type of kidney damage. However, if these animals had lived they would presumably have been the ones most likely to develop hypertension. For this reason, in later experiments the young rats were not deprived of dietary choline for unbroken periods of more than five or six days. Accordingly, greater numbers survived this stage, and these included many in which a severe degree of kidney damage had been produced by choline deficiency.

In the experiments of Sobin and Landis rats were maintained on the choline-deficient diet for a period of months. During the initial period of acute deficiency 66% of the males and 20% of the females died. The growth of the surviving animals was distinctly slower than that of the controls, and the difference in weights at five months was conspicuous. Our experience in similar investigations confirmed the findings of these workers. The absence of hypertension in any of the animals maintained for prolonged periods on these deficient diets might be explained in either or both of two ways. Those animals most susceptible to the lack of choline may not have survived the initial period of acute deficiency. A second possibility is that the retarded growth of the surviving rats may have prevented the development of hypertension. In our present series, animals surviving the initial period of dietary deficiency were transferred to full diets, and growth from then on approached that of the normal controls. The higher growth rates may have made greater demands on the cardiovascular–renal systems of these animals with residual kidney damage, and thus have initiated the development of hypertension.

The clinical significance of our results is not apparent. Attempts to produce the haemorrhagic renal syndrome in any species other than the rat have not yet been successful. In this laboratory further investigations are being undertaken to increase the percentage of those rats surviving "haemorrhagic kidney" which have severe degrees of residual renal damage. If this can be accomplished we will have at our disposal a useful method for the production of experimental hypertension in rats in addition to those which involve surgical intervention or the injection of hormones or of nephrotoxic agents. The problem is to determine how long to deprive the young animals of dietary choline to produce consistently the maximal amount of irreversible renal damage compatible with life.

We may suggest that the wider application of the principle of subjecting young animals to acute deficiencies of one or more essential food factors, followed by periods of growth approaching or exceeding the normal in rate, may reveal other and hitherto unsuspected effects of the initial deficiency. We hope to explore some of these possibilities.

Summary and Conclusions

In this series of observations all the rats in which a severe degree of residual renal damage was produced by a short period of choline deficiency during early life later developed a definite hypertension.

The average blood pressure of this test series was 195 mm. Hg as determined by arterial cannulization, while that of the controls was 118 mm. Hg.

The average weight of the hearts of the hypertensive animals was almost double that of the controls. The histological picture of the arterioles of these animals was characteristic of advanced hypertension.

When only a moderate degree of residual kidney damage was produced by choline deficiency the hypertension, cardiac hypertrophy, and other pathological changes were correspondingly less.

There is no apparent immediate clinical application of these findings. Our results suggest that further work may provide a simple way of consistently producing hypertension in an experimental animal by dietary means.

The kindly interest of Professor William Boyd is gratefully acknowledged. We are also indebted to our colleagues Dr. J. H. Ridout and Dr. C. C. Lucas for their help, and to William Wilson for technical assistance. The photomicrographs were made by one of us (W.S.H.).

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SEVERE HYPERTENSION WITH RECOVERY AFTER NEPHRECTOMY

BY

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[WITH PHOTOGRAVURE PLATE]

Severe hypertension is a disease which may occasionally undergo partial regression under medical treatment or following surgical ablation of the appropriate sympathetic ganglia with splanchnicectomy. In both these instances this improvement may be sufficient to permit the survival of an occasional patient even for a number of years, but still with a considerable elevation of blood pressure. Any case, however, in which as a result of treatment the blood pressure falls to normal levels and remains there is extremely rare and therefore worth recording.

This desirable result has occurred in a young woman with severe hypertension referred for routine investigation of her renal tract. As a result of the investigations undertaken the left kidney was regarded as the source of her hypertension, a view which has subsequently been confirmed by the maintained fall of blood pressure following nephrectomy and extirpation of the left adrenal gland. The details of the case are as follows.

The patient was a young woman aged 20, suffering from diplopia. She worked as a thread-spinner. There was a history, in July, 1947, of polyuria, two-hourly during the day, rising twice at night; in August to October of amenorrhoea, headaches, vomiting, and loss of weight; in October of diplopia on looking to the left; and in November of slight drowsiness and a little oedema of the ankles. There had been no headaches, paraesthesia, dimness of vision, or other palsies. There was nothing relevant in her previous history or that of the family. Her social conditions were good.

On examination her intelligence, nutrition, and colouring were good. There was slight oedema of ankles. The pulse was 80 regular, the vessels soft—? slight enlargement of heart—and the sounds pure. The electrocardiogram revealed nothing abnormal. B.P. 210/140. The blood picture was normal. There was paralysis of the left external rectus muscle. Both fundi showed papilloedema and dilated veins. The left retina showed as well some small haemorrhages and patches of exudate. The visual fields and the cerebrospinal fluid were normal. The urine had a specific gravity of 1008; there was a haze of albumin, but no cells or casts. The blood urea was 35 mg. per 100 ml.

On *x*-ray examination the skull and heart were normal, and the abdomen contained no calculi. Intravenous pyelograms showed that the function and outline of the right kidney were normal. The left appeared to function poorly and was not well outlined (Plate, Fig. 1).

Cystoscopic examination revealed no abnormality in the bladder, and both ureters were catheterized easily the full distance. Specimens from both kidneys and bladder were sterile and cell-free. The left retrograde pyelogram was of the small apelvic normal type (Fig. 2). Differential renal function: observation period, 20 min.; right kidney, 11 ml., *p*H 7, urea 0.55%; left kidney, 0.3 ml., *p*H 5.6, urea 0.8%; wastage, *nil*.

Dec. 16, 1947.—High spinal anaesthesia was carried out by Dr. H. H. Pinkerton, anaesthesia reaching to the level of the fourth dorsal segment. The blood pressure fell to 140/95 without distress. Intravenous pyelography was repeated under the spinal anaesthetic with no appreciable difference in the appearances or function of either kidney, and the opportunity was taken to do a muscle biopsy. In his report on this Dr. W. A. Taylor states that the peripheral arterioles show hyperplasia of the media without necrosis or fibrosis.

Dec. 23.—Under intratracheal gas-oxygen-and-ether (Dr. Beaton) the left renal area was exposed through a modified Fey's approach, the twelfth rib being removed. The kidney was small, pale, and contracted, with a slightly granular appearance on its subcapsular surface. The adrenal gland felt much firmer and the medulla appeared larger than normal. It was removed first with little appreciable effect on the blood pressure; the kidney was then removed, and within half an hour the blood pressure had fallen to 115/70 (see Chart 1). These procedures were completed without incident and the wound was closed without drainage. Convalescence was uneventful: the behaviour of the blood pressure and pulse rate during convalescence is shown in Chart 2.

Histological examination of the adrenal showed it to be 8 g. in weight—i.e., approximately 1 g. above normal. Careful serial slices revealed no evidence of other abnormality and no tumour could be found. The appearances of the kidney are illustrated in Fig. 3.

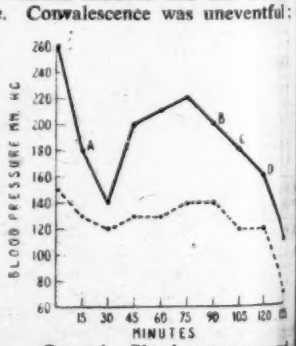

CHART 1.—Blood pressure record during operation. A. Incision made. B. Adrenalectomy completed. C. Renal pedicle clamped. D. Operation completed.

The pathological report (Dr. W. A. Taylor)

was as follows. "The kidney (104 g.) shows marked foetal lobulation; the capsule strips easily to reveal a relatively smooth surface. On section the cortex shows some irregular narrowing. The medullary pyramids are of normal size and shape, but in the central part of each the normal markings are lost in a wedge-shaped area of gelatinous-looking tissue which makes up about half of the bulk of most pyramids. The kidney pelvis and hilar vessels appear normal. Histological examination shows the cortex scarred by chronic pyelonephritis. The central part of each pyramid is occupied by extremely dilated and tortuous tubules; this change does not extend into the terminal collecting tubules, and the appearances are not suggestive of their being due to back pressure or to scarring of the apices of the pyramids."

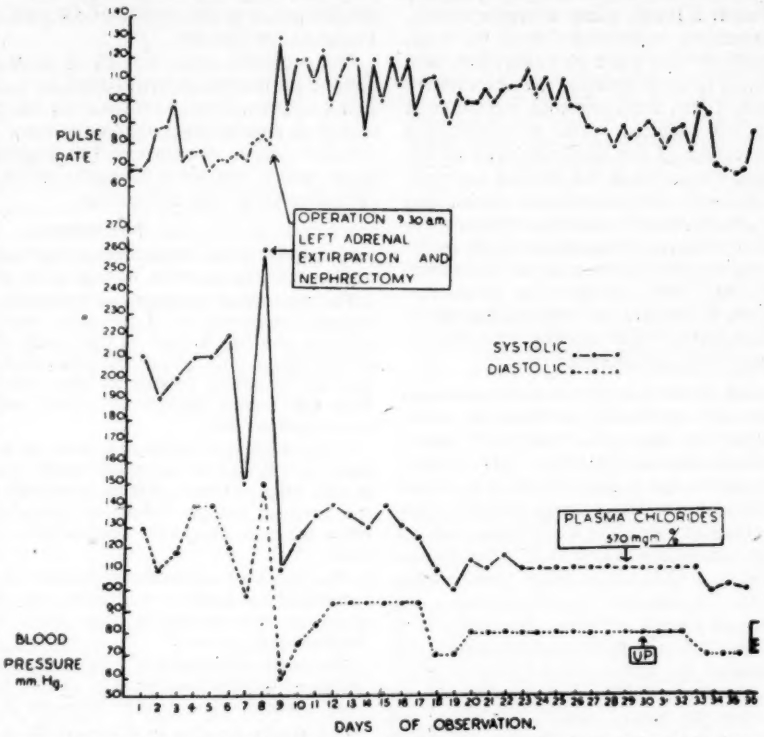

CHART 2.—This shows the behaviour of the blood pressure and pulse rate for some days before operation and in the convalescent period. It demonstrates the irregularity of the blood-pressure levels in conditions of complete rest before operation and shows the severe disturbance produced even in a young person by such a steep and continued reduction in blood pressure.

Subsequent progress has so far been satisfactory. The renal function as tested by the Volhard–Fishberg concentration and dilution test was virtually normal nineteen days after the operation, and at three months could not be improved upon. (See Table.) Twenty-one days after operation the serum chlorides were somewhat low (570 mg. per 100 ml.), but had reached normal figures at three months (670 mg.). The palsy of the left external rectus had cleared up during the period of rest prior to operation, and sight improved from the first post-operative day. The papilloedema had vanished from the left eye on the tenth day, and at three months A/V ratio and vessels were normal and no exudates or haemorrhages could be seen although the disk margins were still a little misty.

Results of Volhard–Fishberg Tests

Date:	Pre-operation 28/11/47		Post-operation 11/1/48		19/3/48	
Time	Urine	S.G.	Urine	S.G.	Urine	S.G.
5 a.m.	6 oz. (170 ml.)	1020	26 oz. (737 ml.)	1022	11 oz. (312 ml.)	1034
6 a.m.	2 oz. (57 ml.)	1010	3 oz. (85 ml.)	1010	2 oz. (57 ml.)	1020
7 a.m.	18 oz. (510 ml.)	1002	14 oz. (397 ml.)	1002	18 oz. (510 ml.)	1000
8 a.m.	6 oz. (170 ml.)	1002	21 oz. (595 ml.)	1000	16 oz. (454 ml.)	1000
Amount returned	26 oz. (737 ml.)		38 oz. (1·08 l.)		36 oz. (1 l.)	
B.P. ..	210/140		110/80		120/80	

Operation was performed on Dec. 23, 1947.

Seven and a half weeks after operation the blood pressure on reporting as an out-patient was 130/90, rising to 140/100 after five minutes' immersion of both hands in ice-water. Three months after operation the readings after forty-eight hours' bed-rest were 120/80, rising to 130/80 in reaction to the cold pressor test.

At six months she reported after doing four full weeks' work as a thread-spinner and dancing till midnight each Saturday night. She was symptom-free and the blood pressure 120/80 without preliminary rest. Her sight was perfect, and it was felt that she could be regarded as a probable cure.

She was seen again on Jan. 8, 1949, when she reported that she had lost no time since her return to work. She was still symptom free with blood pressure 120/80 mm. Hg and normal urine.

Discussion

The remarkable feature of this case is the complete return of the blood pressure to normal level and the maintenance at that level six months after operation without any restriction of the activities usual for a young woman of 20. The rarity of this result in renal disease associated with hypertension is revealed in a recent survey of the literature by Langley and Platt (1947). They recorded one personal case in a child of 8 years and collected only seven cases from the literature in which papilloedema associated with hypertension was successfully treated by nephrectomy. In cases of this kind the blood pressure is as a rule beginning to rise three months after operation, and by six months is often at or approaching its original level. This general failure to maintain the early clinical improvement has cast considerable doubt on the applicability of Goldblatt's experimental work on hypertension in animals to that disease as found in man, and Pickering (1948) is quoted as stating that the hypothesis that some forms of hypertension in man are due to the renin–hypertensin mechanism is unsubstantiated.

This case is therefore of special significance, for it provides material evidence that in certain conditions the human kidney can in fact elaborate a pressor substance and so initiate severe hypertension through this mechanism, or something very much like it. This view is based on the absence of any appreciable fall in blood pressure at operation immediately after the extirpation of the adrenal gland, the normal appearance of that organ on histological examination, and, lastly, the rapid and sustained fall in pressure occurring within half an hour of nephrectomy. The clinical course of this girl's case, so far, suggests that nephrectomy offers the hope of a cure in this type of case provided the renal lesion is recognized at an early stage of the disease—that is, before the irreversible changes of arteriolar sclerosis have occurred in the peripheral vessels and those of the opposite kidney.

The recognition of such a lesion is not a simple matter, and before surgical treatment is advised a most thorough investigation of the urinary tract must be undertaken, and in cases of doubt repeated in three months. Since treatment was urgent in this case, it was fortunate that repetition of the investigation was not required. The tests described here are, with the exception of the administration of the spinal anaesthetic, those employed in the routine examination of hypertensive patients. Experience has shown that the most informative combination of investigations for this purpose is the Volhard–Fishberg concentration and excretion test, with intravenous pyelography and the differential test of renal function. The basis and the value of the first two are too well known to require any explanation here; the value of testing differential renal function by collection and analysis is not generally appreciated.

The method favoured consists in the catheterization of both ureters at cystoscopy, preferably without an anaesthetic, and the collection of specimens from each kidney for bacteriological examination and analysis. The bladder urine obtained at the cystoscopy is also examined bacteriologically and analysed, as the results provide a useful comparison with those obtained from the examination of the renal urines. The specimens are collected in tubes graduated in ml. for a period which varies from case to case. Wastage to the bladder is minimal. In this instance the collection was made over twenty minutes. The quantity is measured, the *p*H estimated in a B.D.H. capillometer, and the urea content obtained by analysis in a Doremus ureometer, using a 1-ml. tuberculin syringe graduated in hundredths and a specially curved needle to deliver the urine to the ureometer. This permits the use of small quantities when only these are available. Blood is withdrawn for the estimation of non-protein nitrogen.

Consideration of the results of this analysis in conjunction with the intravenous pyelogram gives a reasonably accurate indication of glomerular activity and tubular function, and a reliable picture of the relative function of each kidney is therefore obtained. It cannot be emphasized too strongly, however, that both the intravenous pyelogram and the differential function test must show similar trends before surgical abnormality is accepted and the renal region is explored with a view to nephrectomy. In the present case the results of these investigations were thought to indicate gross diminution of glomerular activity with excessive tubular absorption.

The high spinal anaesthetic was administered here in an endeavour to discover if any change in the excretion of "pyelosil" would be effected by its influence. If this had occurred the surgical attack would have been directed at the thoracic ganglia and splanchnic nerves on the left side. The muscle biopsy was done at this time for convenience and to exclude polyarteritis as a cause of the rather unusual grouping of symptoms presented by this case.

The cause of the lesions in the kidney is obscure. The possibility of pregnancy was not admitted, and it is therefore likely that there has been a haematogenous pyelonephritis with much subsequent scarring of the cortex. The gross tubular dilatation may also have been due to this cause, or possibly it was the result of some congenital defect in the tubular architecture. Whatever the primary cause, the lesion has had a profoundly constrictive effect on the cortical blood flow. This was suggested clinically by the appearance of the intravenous pyelograms and the differential renal function test. These findings and the subsequent clinical course of the case, considered with the histology of the kidney, form strong evidence in favour of renin elaborated in this cortex as the cause of the hypertension. More detailed histological examination is being made of this kidney, and the result will be published by Dr. W. A. Taylor in due course.

The prognosis must for the moment be guarded, but if the present position is maintained for a year it will be good. This prophecy is based on the early return of renal function to a high normal level, the continuance of a normal blood pressure despite a return to full activity, and the absence of necrosis or fibrosis in the media of the peripheral arterioles examined under the microscope.

Summary

A case of severe hypertension with advanced retinitis and papilloedema in a young woman of 20 is described.

The presenting symptom of headache, with vomiting and diplopia, suggested an intracranial lesion, but investigation revealed the left kidney as the likely cause. The removal of that organ with the adrenal produced a return of the blood pressure to normal in half an hour and a complete recovery from the retinal changes in a few weeks. This has been maintained to date.

In the discussion reference is made to the significance of this result in relation to the experimental work of Goldblatt. It is also suggested that, if these cases can be recognized before the vascular changes elsewhere are permanent, nephrectomy offers the hope of a cure; reasons are given in support of this view.

The rarity of successful treatment in this type of case is mentioned, and stress is laid on the necessity for a most thorough investigation of the renal tract before surgical measures are advised.

The value of differential renal analysis in the general investigation of hypertensive patients and in the recognition of this type is noted. The method favoured is described.

My thanks are due to Professor D. F. Cappell for valuable criticism during the preparation of this article; to Dr. W. A. Taylor for the great interest and care he has taken with the histology and for the photomicrograph; and to Mr. W. W. Galbraith, in whose wards the patient was treated. I am also indebted for Chart 2 to Professor C. F. W. Illingworth's staff in the department of surgery. The radiographs are reproduced by courtesy of Dr. S. D. Scott Park, director of the *x*-ray department, Western Infirmary.

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BLOOD CHANGES IN LUMINIZERS USING RADIOACTIVE MATERIAL

BY

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[WITH PHOTOGRAVURE PLATE]

"Luminizing" is defined in the Factories (Luminizing) Special Regulations of 1947 as "the application of luminous compound to any surface, or the introduction of luminous compound into glass tubing," while "luminous compound" means "luminous material containing a radioactive substance." In its dry form luminous compound is a powder consisting of zinc sulphide with a small admixture of radium or mesothorium, the usual proportion for non-civilian purposes being 70 micrograms of radioactive substance per gramme of compound. Only a small amount is used dry, the greater part being converted into a paint by the addition of various mucilages and solvents. In the wartime industry of luminizing, this paint was applied by hand, by operatives called "luminizers," to aeroplane or watch dials, compasses, gun-sights, and various electrical instruments.

At the beginning of the 1939–45 war it became obvious that the luminizing industry would eventually involve the employment of a large number of luminizers, and in view

of the tragic results which followed, sometimes several years after cessation of work, such employment in America from 1917 to 1924 (Martland, 1931) it was decided that, in addition to the introduction of special regulations devised to protect the luminizers from excessive radiation, clinical and blood examinations should be made by a medical inspector of factories as part of the long-term research into the effects of such work on health.

At the end of the war, when the luminizing industry showed a rapid decline and consequently the number of luminizers a considerable diminution, it was recommended by the Advisory Panel on Radiology set up by the Minister of Labour that a "follow-up" of all luminizers, including a full blood examination, should be carried on for some years.

The following survey comprises the result of the blood examination of luminizers in the course of their employment from 1940 onwards, and of the "follow-ups" from 1945 to January, 1949.

No. of Luminizers Examined		No. of "Follow-ups" Examined	
1941	353	1945	68
1942	350–400	1946	167
1943	430	1947–8	131
1944	460		
1945	534		
1946	113		
1947	81		

"Control" Examinations.—The ideal method of making a controlled investigation of the blood picture of luminizers would of course have been to examine them before their exposure to radioactive substance. This was done whenever possible, but the necessity for providing the essential luminized instruments in wartime made it impossible to hold up the work in a number of cases sufficient to make the controls adequate.

Blood samples of 100 girls of comparable age group and environmental conditions (shop assistants and typists) were therefore taken. The results were compared statistically with those of the luminizers examined between 1940 and 1942.

The only significant variation in the total and differential blood counts of the luminizers at that time was found to be an increase in the number of lymphocytes. No statistical examination of the incidence of abnormal cells in the stained film was made, but no abnormal cells were observed in the films of any of the controls.

Blood Picture of Luminizers

The characteristic deviations from the normal blood picture in a fairly high proportion of all luminizers were as follows:

A Relative Lymphocytosis, with a Moderately High Total White Cell Count.—The actual incidence of relative lymphocytosis (without neutropenia) was as follows: 1941, 22% of all luminizers; 1942, 27%; 1943, 40%; 1945, 27%; 1946, 22%; 1947, 22.5%. In many of these cases the degree of lymphocytosis was high—a typical polymorph/lymphocyte ratio was 40/50—so that an absolute lymphocytosis (3,500–4,000 per c.mm.) was not uncommon.

The Presence of Some Abnormal Cells in the Stained Film.—The presence of abnormal cells, which included occasional Türk cells, occasional premyelocytes, and, most characteristic of all, large mononuclears of immature type, occurred very constantly in about 9% of all cases each year. The abnormal monocytes were of special interest. Frequently they occurred in the same film with large mononuclears of perfectly normal appearance, constituting 30–60% of all large mononuclears present. These "abnormal" mononuclears were generally of two kinds:

1. *A "lymphoidocytic" type* (Figs. 3 and 4) corresponding closely to those described by Hittmair (1942) as "*kleine Monocyten der Lymphknoten*," to the "young monocyte" observed by Duvolon (1947) in the blood of the rat, and to the young monocyte which Tzanck, Dreyfus, and Bessis (1944) described as follows: "Size 15–30 μ, nucleus of 'combed' appearance, regular, with no dense masses of chromatin. The nucleus may be round, oval, or bent at several points, rectangular or trapezoid; it may be free in the cytoplasm or adherent at one point to the periphery by a wide pedicle, sometimes cutting the cytoplasm in two parts. The cytoplasm is weakly basophil, hyaline, sometimes polychromatic, the edges clear and sometimes more deeply stained than the rest, and occasionally showing azurophil granules. It is difficult to distinguish from a large lymphocyte."

2. *A large "granular" type* (see Fig. 5). The characteristic features of this large cell (18–25 μ in diameter), when stained by Wright's or Leishman's stain, are a ragged, spreading, dense nucleus and a heavy granulation of the cytoplasm. A few of these cells identified in smears stained by Washburn's peroxidase method could be distinguished from early cells of the myelocyte series by the small size and dark blue staining of the cytoplasmic granules, as opposed to the large greenish granules of the polymorphonuclear leucocyte.

Red Cells and Haemoglobin Levels.—Anaemia, even of slight degree, was a relatively infrequent feature in luminizers, only 8–10% showing a red cell count below 4,500,000 and a haemoglobin level below 84%. In the few cases in which the anaemia was more severe, this was accountable by pregnancy, post-operative anaemia, or other disorders of health not associated with their occupation. In about 15% of all luminizers the red cell and haemoglobin levels were rather higher than would be expected in girls of this age and social environment—red cells up to 5,000,000 per c.mm. and haemoglobin values up to 98–100%. Statistical examination showed, however, that the mean red cell count was 4,663,785 in the luminizers as compared with 4,780,000 in the controls.

Blood Picture in Ex-luminizers (Follow-ups)

So far 366 luminizers employed during the war, and having had no exposure for periods of one to five years, have been followed up and examined both clinically and haematologically. The comparison of their present blood picture with that observed during their employment may be summarized as follows: (1) Abnormal cells are absent in all cases except one, a girl who suffers from an endocrine dysfunction, with amenorrhoea, adiposity, and hypertrichosis. (2) Relative lymphocytosis is present in only a few cases and is of slight degree. (3) White cell counts are generally rather lower—5,000 to 7,000 per c.mm. as compared with 7,500 to 8,500 during employment. (4) Red cell counts and haemoglobin values show a fall—in those cases in which they formerly reached 5,000,000 per c.mm. and 100% they fell to 4,000,000–4,500,000 and 80–90% respectively.

Extent of Exposure of Luminizers to Radioactive Substance

The potential exposure consisted of (1) external irradiation by alpha particles and beta and gamma rays, (2) inhalation of radon, emanating from the luminous compound, (3) ingestion of luminous compound from contamination of the hands, and (4) inhalation of radioactive dust.

With regard to *external irradiation* the hazard was obviously small, partly because the actual amount of radium in use at each workplace was very small, not more than 1 g. of compound being mixed in the paint container at a time, and partly because the distance factor of safety was utilized by placing a glass screen between the luminizer and her work. *Inhalation of radon* was reduced to a minimum by the provision of mechanical exhaust draught so arranged as to produce a current of air in a direction from the worker towards the work.

The danger of *ingestion* was much less than in the New Jersey cases, where it was known that the luminizers were

in the habit of pointing with their lips the brushes used for applying the luminous paint; by the Luminizing Order of 1941 the use of brushes was prohibited, pens or solid applicators being used instead. Ingestion from contamination of the hands was obviated by special requirements for frequent washing.

There remained the hazard of *inhalation of radioactive* dust, and, though this was reduced to a minimum by the enforced daily washing of benches and floors and prohibition of extraneous articles in the luminizing room, the fact that small splashes of paint on benches and floors were occasionally allowed to dry and become converted into fine powder was not seldom revealed by the illumination of an ultra-violet lamp. It is chiefly to this small amount of what might be called "internal" exposure, as contrasted with the "external" exposure of alpha, beta, and gamma radiation, that I am inclined to attribute the changes, which I consider characteristic, in the blood picture of luminizers, to be described below. That the amount of radium so inhaled was not sufficient in the great majority of cases to lead to a measurable deposition in the tissues has been proved by the fact that repeated tests of luminizers in whom such deposition might have been suspected have shown the presence of less than 0.2 μg. except in one case, a woman who had luminized, to a large extent in unregulated conditions, for 25 years; she showed a radium content of the tissues amounting to 0.7 μg. These tests, carried out by the National Physical Laboratory, Teddington, consisted of direct gamma-ray estimation by means of a Geiger counter and estimation of the radon content of the expired air. Thus it would seem that any effect reflected in the blood picture would be slight and temporary, and the results of blood examinations of luminizers after an interval of non-exposure bear out this view.

Blood Picture in Severe Exposure to Radium

It is well known that the most frequent consequence of overexposure to the gamma rays of radium is a depressive effect on the bone marrow, leading to a severe, often fatal, aplastic anaemia. This may occur as a direct result of a single very severe exposure; during the course of long-continued less severe exposure; or after exposure has ceased, either from irreparable damage to the bone marrow due to external irradiation or to internal irradiation from the deposition in the tissues of radium derived from ingested or inhaled radioactive substance. Such a depressive effect is reflected in the blood picture as an eventual diminution of all the formed elements of the blood—the development of aplastic anaemia.

In the early stages the one consistent sign of overexposure is an absolute and progressive leucopenia, with a relative lymphocytosis causing an associated neutropenia or in some cases with a lymphopenia. *This sign has been conspicuously absent in the luminizers examined between 1940 and 1947.* The deviations in their blood picture suggest on the contrary a hyperstimulative effect, which appears to be produced by a mode of action entirely different from the depressive effect on the bone marrow of external gamma radiation.

Discussion

The Normal Monocyte and the Reticulo-endothelial System.—In 1937 Schilling suggested that the monocyte was derived chiefly from the reticulo-endothelial system and to a less extent from the bone marrow and the lymph glands. This theory is strongly upheld by the French school of haematologists, especially Tzanck, Dreyfus, and Bessis (1944) and Frühling and Roger (1948). The latter authors have described in great detail the reasons on which they base their opinion. These consist chiefly in examinations, by the peroxidase-staining method of Sato, of portions of human lymph glands, bone marrow, adult and embryonic liver, and spleen. They state that they have been able to follow by this method the actual process of monocytogenesis from a special functional portion of the reticulum—that portion which possesses the function of granulocytophagia.

The Primitive Monocyte.—The normal monocyte (Figs. 1 and 2) therefore, according to the results of Frühling and Roger's investigations, differs from the polymorphonuclear leucocyte and the lymphocyte in being derived from a matrix tissue and not from a primitive blast cell; there is no such cell as a monoblast. There seem to be different grades of the young monocytes or, as Hittmair calls them, "promonocytes," the youngest of all resembling in some respects the myeloblast (Hittmair, 1942), the later ones being difficult to distinguish from large lymphocytes (Duvoloc, 1947).

Radium and the Reticulo-endothelial System.—When radium is taken into the body by ingestion, by inhalation of radioactive dust, or by inhalation of radon, which during disintegration is reconverted to radium, a certain amount is excreted by the urine and faeces and by the lungs in the form of radon. With small dosage and interrupted exposure it is highly improbable that the amount deposited in the tissues will exceed the "tolerance dose," estimated in America as 0.1 μg. With larger doses and long-continued exposure the results of heavy deposition in the bones are unfortunately well known—the development of malignant growths in the bones or of severe injury to the bone marrow leading to aplastic anaemia.

Whether the reticulo-endothelial system is involved in the potential deposition in or the passage through the tissues before excretion has not been investigated in human beings, but some unpublished observations by Dr. Mather Cordiner (personal communication), though not entirely relevant to the conditions under discussion, suggest that this is the case. In investigating the possible deleterious effects of a radioactive substance introduced as a contrast material for x-ray diagnosis, Dr. Cordiner, in conjunction with Dr. Hamilton Fairley, administered thorotrast by mouth to rats over a period of two years. At the end of this time the radioactive material was found deposited in the reticulo-endothelial system of the liver and spleen, where it produced areas of necrosis in these organs and to some extent remained as a potential source of radioactivity in the body.

Conclusions

It would not seem unreasonable, taking the above facts into consideration, to formulate the following hypothesis to explain the haematological findings in luminizers: That the actual effects are of the nature of a hyperstimulation rather than depression of the haemopoietic system; that this hyperstimulation is related to the reticulo-endothelial system rather than to the bone marrow; that it is caused by inhalation of small amounts of radioactive dust; and that it is transient only, and in the working conditions of luminizers is not likely to be accompanied by a permanent deposition of radium in the tissues. Each of these points is discussed in detail.

Hyperstimulation.—The hyperstimulative effect is suggested by the "high normal" total white count, the relative lymphocytosis, and the presence of abnormal cells, which consist chiefly of what seem to be young forms of the large monocyte. That these deviations are practically non-existent in ex-luminizers who have had no exposure to radioactive substance for some years, and that red cell and haemoglobin values which were rather higher than would be expected in some girls of this age group and social environment show a fall when exposure has ceased,

facts which also point to the occurrence of a hyperstimulative effect during employment.

Relation to the Reticulo-endothelial System.—The character of the abnormal cells observed—young forms of the monocyte—suggests that these are being produced by the reticulo-endothelial system under the influence of hyperstimulation. The hyperstimulation would account also for the increased output of lymphocytes from the reticulo-endothelial cells of the lymph glands.

Inhalation of Radioactive Dust.—While it is possible, taking into account the human factor, and in spite of the facilities provided and prohibitions enforced, that careless luminizers may have ingested small amounts of luminous compound or that they may have inhaled a certain amount of radon, it seems more probable, from a study of their working conditions and from estimations of the radon content of the air in luminizing departments, that the inhalation of dust contaminated with dried luminous compound was the chief source of any radioactive material being introduced in small amounts into the body.

Transient Effect.—Both the haematological findings in ex-luminizers without any signs of hyperstimulation and the estimations for radium deposited in the tissues carried out on a number of luminizers employed for long periods suggest that no permanent effect has been produced by the introduction into the body of any small amount of radioactive material.

Whether an actual hyperplasia of the reticulo-endothelial system occurs during the period of exposure it is impossible to judge. As Hittmair (1942) remarks: "When can one assume a hyperplasia of the reticulo-endothelial system in the sense of a leucosis, and when is blood formation in this system to be judged superfluous? We know that we cannot expect any striking histological findings of myelosis or lymphadenosis, since the reticulo-endothelial system is not a closed system but scattered cell groups." On the evidence here presented I can only say that, if such hyperplasia does occur, it must be of a transitory nature, subsiding when the causal agent is removed.

Summary

The results of blood examinations of a number of luminizers over a period of five years have shown no evidence of a depressive effect on the bone marrow, but rather of a slight hyperstimulation, which is tentatively ascribed to an effect on the reticulo-endothelial system.

Blood examinations of the same girls after a period of one to four years following cessation of exposure show a complete disappearance of this hyperstimulative effect.

The characteristic abnormalities of the blood picture of luminizers are described, and the reasons for attributing them to hyperstimulation of the reticulo-endothelial system are discussed.

The transient nature of these changes is supported by the results of direct gamma-ray estimation of the tissues and of estimation of radon in the exhaled air.

My thanks are due to the Senior Medical Inspector of Factories for permission to publish the above results; to the National Physical Laboratory for their helpful co-operation in estimating tissue radium; to Dr. Mather Cordiner for permission to publish his results on ingestion of radioactive material by animals; and to Mr. S. Goodall, H.M. Inspector of Factories (Engineering and Chemical Branch), for producing the photomicrographs of abnormal blood cells.

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ACUTE IDIOPATHIC PULMONARY HAEMOSIDEROSIS

BY

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[WITH PHOTOGRAVURE PLATE]

Non-occupational pulmonary haemosiderosis has often been described in Continental medical literature, but has only recently aroused any interest in this country. It has been reported as a rare complication of mitral stenosis and also as an idiopathic phenomenon. Wyllie, Sheldon, and others (1948) have reviewed the relevant literature, summarized the reported cases of idiopathic haemosiderosis, and presented several cases encountered during recent years at the Hospital for Sick Children, Great Ormond Street, London. All these previously reported cases, with one exception, have pursued a chronic remittent course. The exception is a case described by Ceelen in 1931, in which a period of one month encompassed the onset of symptoms and necropsy confirmation of the diagnosis.

A further rapidly progressive case, in a previously healthy child, is here presented, in which only five weeks separated the initial symptoms and a fatal issue. Clinically the diagnostic problem and general course of the disease, apart from its rapid course, strongly resembled the clinical picture given by Wyllie, Sheldon, and others (1948), but the post-mortem findings did not correlate in the finer details with all those described by them. They do, however, resemble those outlined by Scheidegger and Dreyfus (1945).

Case Record

A small deathly-pale girl aged 2¼ was admitted from an outlying village to the Sheffield Royal Hospital, with a month's history of increasing pallor, lassitude, and general debility. Previously she had been a very active, healthy, and intelligent child, and neither the mother nor the family doctor could recall any previous illness. She was a full-term, breast-fed child, and had developed normally. No family history of consanguinity, allergy, or blood disorder was elicited. No cough, haemorrhage, or petechial phenomena had been noted, and there had been no recognized exposure to noxious agents. No drugs had been administered. In view of a remote family history of tuberculosis a radiograph of the chest, which was reported as normal, was taken at a local tuberculosis clinic.

On admission the child lay inert and uninterested in her surroundings, with no cyanosis or dyspnoea. She was well nourished and of good physique, but her skin showed a translucent waxen pallor unmarred by petechiae or bruises. The pulse was rapid and regular, and there were no signs of cardiac failure or of valvular disease. Respiration was normal, and no abnormal signs were found in the chest. The liver edge was just felt, but the spleen was not palpable. No neurological abnormalities were noted; the ears, fauces, and fundi were normal; and the only other recorded physical sign was a generalized slight adenopathy. The temperature was normal.

Clinically, acute leukaemia or aplastic anaemia appeared highly probable, but the blood picture revealed a severe hypochromic anaemia with leucopenia and the bone marrow showed no gross changes: haemoglobin, 22% (3.2 g.%); red cells, 1,640,000 per c.mm.; colour index, 0.6; white cells, 3,600 per c.mm. (polymorphs 50%, lymphocytes 50%); one late normoblast was seen; slight anisocytosis and poikilocytosis; Group A (II) Rh-positive; no abnormal haemolysins detected; bleeding time, 4 minutes; clotting time, 8 minutes (normal for methods used). Van den Bergh reaction was faint direct positive; serum bilirubin, 1 unit; icteric index, 4. The urine contained excess urobilin and urobilinogen.

One pint (570 ml.) of appropriately selected packed cells was given with suitable precautions, and dramatic improvement ensued. The child became bright and lively, and played with

her toys; colour returned to her cheeks, and she welcomed her meals; the whole picture recalled the dramatic response described in cases of Lederer's (1925, 1930) anaemia after transfusion. The improvement was reflected in the resulting blood picture: haemoglobin, 54% (7.9 g.%); red cells, 2,640,000; colour index, 1; white cells, 7,600 (reticulocytes 4%). A chest radiograph revealed a diffuse reticulation throughout the lung fields. It was more pronounced near the hilar regions, and was reminiscent of that seen in left ventricular failure, though the general clinical picture scarcely seemed appropriate, since only a few very faint scattered rales were to be heard, the respiration rate was normal, and there was no cyanosis. A slight pyrexia attributed to the transfusion was recorded.

General improvement was maintained for five days, after which pallor again rapidly increased, with lethargy and obvious deterioration, which was in keeping with the changed blood findings: haemoglobin, 32% (4.7 g.%); red cells, 1,880,000; colour index, 0.88; white cells, 7,400 (polymorphs 60%, lymphocytes 34%, monocytes 2%, eosinophils 4%); platelets, 560,000; reticulocytes, 2%. A tuberculin test was negative, no parasites were found in the faeces, and attempts to determine the faecal urobilin were abandoned owing to the difficulty of collecting specimens.

A further transfusion with packed cells effected great improvement, but a repeat of the chest radiograph showed increased mottling of the lung fields spreading from the hilar regions, and a review of the case recalled (to Dr. T. E. Gumpert) the clinical picture of idiopathic haemosiderosis described by Wyllie, Sheldon, and others (1948). In view of the likelihood of such a rare condition a more comprehensive investigation of the case was planned, but unfortunately the gravity of the patient's condition necessitated its abandonment. Clinical signs in the chest were still minimal but more definite, and the respiration rate was rising. Improvement was maintained for three days, when gross respiratory signs and pyrexia developed. In spite of an oxygen tent, penicillin, and the routine cardio-respiratory stimulants, death soon supervened.

Radiological Changes

The poor clinical condition of the patient prevented thorough radiological investigation, but the three serial chest radiographs which were taken at intervals during the course of the disease showed reticulation of the lung fields of increasing extent. As in previously described cases, the reticulation consisted of small aggregations of similar size to those seen in miliary tuberculosis, sarcoidosis, or following lipiodol instillation, but the density of reticulation was maximal near the hilar regions and diminished towards the periphery. Such a distribution is akin to that of the mottling associated with passive hyperaemia of the lungs. There was no gross nodulation such as is common in the pneumoconiosis group of lung reticulations.

The first radiograph, taken before admission, showed small changes which were passed as normal until critically reviewed in the light of subsequent developments. At this stage considerable intra-alveolar haemorrhage must have occurred, causing marked anaemia but no appreciable clinical effect on respiratory function. Later radiographs revealed denser reticulation proportionate to the development of impairment of the respiratory reserve, but it must be emphasized that there is a characteristic disparity between the degree of radiological change in the lung fields and the minimal clinical signs in the chest in the earlier phases of the disease (Plate, Figs. 1 and 2).

Necropsy

Gross anaemia was apparent, though there was adequate active-looking bone marrow without evidence of free haemorrhage. There was general slight enlargement of the lymphatic glands, and especially of one at the bronchial bifurcation. The heart, coronary arteries, and general vasculature showed no unusual features, and very careful examination of the pulmonary vessels failed to show any structural or pathological defect.

Gross changes were present in the lungs and pleura, which showed multiple subpleural petechial haemorrhages, a small effusion, and recent pleural roughness. The pleura was a striking deep Victoria-plum colour, whereas the cut lung section was rather browner and similar to that of ordinary brown induration. The lung substance was solid and airless, except for one small segment in the right costo-phrenic angle and its gross appearance was akin to that of confluent bronchopneumonia, for which it might easily have been mistaken, but the texture was much less friable than in that condition. The weight of the lung was significantly more than that of the average normal lung of a child of the same age (right, 360 g.; left, 300 g. Normal weight: right, 118 g.; left, 100 g.).

Histologically the alveoli were crammed with phagocytic free iron-containing cells, which gave a magnificent Prussian-blue reaction, and there was considerable recent intra-alveolar haemorrhage (Fig. 3). There was perhaps a slight increase of interstitial fibrous tissue in places and some thickening of the alveolar walls in parts, but no obvious deficiency of elastic tissue or fragmentation of elastic membrane was demonstrated in the pulmonary arterioles or alveolar structure. No free iron was present in representative parts of the spleen, liver, lymph nodes, or reticulo-endothelial system which were examined.

There was no evidence of pulmonary calcification, miliary tuberculosis, sarcoidosis, or silica deposit. The iron content of the lungs was estimated with normal adult lungs as a control. The dry weight of the haemosiderotic lung was 43.2% of the wet weight, as compared with an average value of 18% for two normal adult lungs. The iron content was 230 mg. per 100 g. of the wet weight or 542 mg. per 100 g. of the dry weight, as opposed to the average value of 63 mg. wet and 320 mg. dry for the two normal adult lungs. At necropsy the lungs were completely radio-opaque.

Comment on Case

Clinically the case presented as an acutely developing anaemia which responded quite dramatically to transfusion, only to be followed by relapse suggestive of an acute haemolytic process. However, once a chest radiograph was available showing reticulation of the lung fields it was possible strongly to suspect the correct diagnosis. Until the later stages pulmonary signs were minimal despite marked changes in the lungs radiologically. Death was asphyxial.

Necropsy showed death to be due to anoxic cardiac failure owing to a reduction in the vital capacity by intra-alveolar haemorrhages and haemosiderin depositions. No significant amount of iron was present elsewhere in representative portions of the reticulo-endothelial system, kidneys, and other organs which were examined.

Unlike many previously reported cases, there was no irrefutable evidence of deficiency in the structure of the pulmonary vessels or the supporting framework of the alveoli.

Radiology of the chest demonstrated a progressive deposition of opaque material in small aggregations throughout the lung fields, but maximal near the hilar regions.

Discussion

It is hoped that the rarity of idiopathic pulmonary haemosiderosis is adequate justification for reporting an isolated case of the disease, especially since it exhibits certain debatable features. Despite the obscure aetiology, and although the course is progressive, ultimately fatal, and virtually uninfluenced by present treatment, it is important to make the syndrome more widely known so that it may be further studied.

Previous reports of the disease have endeavoured to explain it as being due to an unidentified haemolytic agent, but since modern haematological investigation fails to detect any haemolysins, and since there is no necropsy evidence of general distribution of haemoglobin breakdown products in the reticulo-endothelial system, haemolysis seems an unsatisfactory explanation. It might have been expected that the condition was due to a blood dyscrasia, but routine investigations have not demonstrated any recognizable haemorrhagic disorder.

The presence of large amounts of iron in the tissues naturally raises the question of any possible relationship to haemochromatosis, but there is no real correlation between the clinical features or pathological findings in haemochromatosis, which is a general disturbance of iron

metabolism, and the syndrome of idiopathic pulmonary haemosiderosis.

It has been postulated that the intrinsic structure of the pulmonary vessels and the alveolar framework is defective, but such a view could not be adequately confirmed in this particular case. Histological sections from grossly affected parts of the lungs stained with special elastic stains show elastic tissue in apparently normal amounts. It must, however, be admitted that for several reasons it is extremely difficult to assess any apparent changes in the elastic structure of the lungs and lung vessels. The elastic elements are in themselves very small, and from their intrinsic property of elasticity the range of normal variation is wide and dependent upon a variety of environmental circumstances. When the alveoli are distended the elastic fibres seem thin, fibrillary, and scanty, whereas in the collapsed alveolus they are thick and rod-like. Stellate aggregations may appear when the elastic fibres are ruptured and contract irregularly to a maximal extent.

It is not suggested that there is any parallel between the modes of production of pulmonary infarction and idiopathic haemosiderosis, but it is interesting to note that, in suitably stained sections of infarcted lung, changes in the elastic tissue such as those described above may be found. No doubt the changes are partly the result of simple mechanical damage produced by alveolar overdistension in the infarcted area.

In view of these observations it is difficult to accept without considerable misgivings the theory that idiopathic haemosiderosis is due to a defect in the lung structure. Possibly the so-called "fragmentation" of elastic fibres and the various fibrous thickenings of the alveolar walls which have been described elsewhere represent the result rather than the cause of the disease, especially since they are noted in the post-mortem reports relating to the more chronic cases of the disease, where reactive and degenerative changes might be expected. Furthermore, it may perhaps reasonably be speculated whether in some reports of this disease there has been insufficient consideration of the range of normality in the elastic content of lung tissue.

Gumpert (1947) has described non-occupational pulmonary haemosiderosis in association with the long-standing pulmonary congestion found in a case of mitral stenosis. Some unrecognized additional factor must obviously operate to account for the rarity of gross haemosiderosis associated with mitral stenosis as compared with the great incidence of mitral stenosis, but by analogy might one speculate whether periodical increases in pulmonary arterial pressure of unknown cause might operate during the development of the idiopathic disease? The manner in which there are radiological indications of greater iron deposition near the hilar regions is reminiscent of the distribution of the hilar shadowing due to vascular congestion and pulmonary hypertension in early left ventricular failure. No myocardial or vascular cause for pulmonary hypertension was, however, recognized in the present case.

Wider recognition of the syndrome will no doubt permit its more extensive study and enable a more satisfactory explanation to be developed.

I am grateful to Dr. T. E. Gumpert for permission to report this case, which was admitted under his care, and to Dr. J. L. Edwards, who carried out the post-mortem examination. I should also like to thank Drs. J. L. Grout and T. Lodge, who helped me with the radiological interpretation, and Dr. A. Jordan for his assistance with the biochemical investigations. The radiographs are reproduced by courtesy of Dr. Grout.

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DISSEMINATED OSSIFICATION OF THE LUNGS IN ASSOCIATION WITH MITRAL STENOSIS

BY

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[WITH PHOTOGRAVURE PLATE]

Heterotopic ossification is a well-known phenomenon occurring in foci of pathological calcification in many parts of the body. In the lungs ossification of calcified tuberculous lesions in the apices has been frequently observed. Much less common are cases of disseminated pulmonary ossification, which occurs in two forms: (*a*) trabecular, found in the interstitial tissue as a senile change, and (*b*) nodular circumscribed, observed in younger persons suffering from mitral disease associated in most cases with chronic passive congestion. The nodular form is extremely rare, fewer than 40 cases having been recorded in the literature. A further case is here described.

Case Record

The patient, a single woman aged 39, was admitted to the West Middlesex Hospital on March 3, 1947. For nine years she had suffered from gradually increasing effort dyspnoea, with occasional swelling of the ankles. During the month before admission she had had a cough productive of greyish-white sputum. In the last four days the cough and dyspnoea had greatly increased. She had had rheumatic fever at the age of 20. There was no previous history of pneumonia.

On examination the patient was cyanosed and mildly dyspnoeic. The temperature was 101.6° F. (38.7° C.), the pulse rate 120, and the respiration rate 32. Considerable cardiac enlargement was found, the apex beat being situated in the sixth space 5 in. (12.7 cm.) from the midline. Mitral presystolic and early diastolic murmurs were heard, and there were occasional extrasystoles. There was no evidence of an aortic lesion. The blood pressure was 125/80. No peripheral oedema was seen, but the jugular venous pressure was 3 cm. above the sternal angle with the patient tilted 30 degrees from the horizontal. Examination of the lungs showed signs of consolidation at the right base, with a pleural rub in the right axilla. Scattered rales were heard over the left lung. In the abdomen slight tenderness was found in the right hypochondrium, but the viscera were not palpable. No abnormality of the central nervous system was detected.

It was considered that the patient was suffering from right basal pneumonia and early cardiac failure due to mitral stenosis, and that most of her dyspnoea was caused by the former.

A blood examination on admission showed: haemoglobin, 94%; leucocytes, 12,000 (polymorphonuclear cells 85%). The sputum yielded mixed organisms. A Mantoux test was negative. Radiographic findings are discussed below.

On admission the patient was treated with sulphamezathine (30 g. in four days), oxygen, sedatives, and a linctus. Two days later a course of intramuscular penicillin was begun, 2,400,000 units being given in eight days. In spite of chemotherapy the temperature never settled, but varied from 97 to 100° F. (36.1 to 37.8° C.), rising terminally to 103° F. (39.4° C.). Dyspnoea was at first greatly relieved.

On the tenth day after admission numerous rales and scattered areas of tubular breathing were heard on both sides of the chest, and the sputum had become blood-stained. The liver was palpable 1 in. (2.5 cm.) below the costal margin. Dyspnoea was not in evidence while the patient was at rest, but the respiration rate varied from 24 to 32 a minute. The possibility of infarction of the lungs was considered. Three weeks after admission a generalized scarlatiniform rash appeared, ascribed to drug sensitivity. It faded in three days. The general condition showed little change.

On the twenty-eighth day after admission the patient passed a comfortable day, but at 11 p.m. she suddenly collapsed, dying within a few minutes.

Radiological Reports.—March 6:—Both middle zones showed impairment of a congestive type, more pronounced on the right side. Both lung fields were infiltrated with generalized miliary shadowing, more intense in the basal zones (Plate, Fig. 1). The nodules were discrete and averaged 0.5 to 2 mm. in diameter. No pleural effusions were seen. The heart was enlarged in its transverse diameter and had a contour suggestive of mitral stenosis. *March 26:*—An effusion had developed in the right costo-phrenic angle. The miliary opacities remained unchanged, showing no tendency to resolution or confluence. The tentative diagnosis of haemosiderosis was made.

Necropsy

Macroscopic Appearance.—The subject was well nourished and showed slight oedema of the lower extremities. About 300 ml. of clear straw-coloured fluid was found in each side of the thorax. The heart weighed 570 g. and exhibited gross right ventricular hypertrophy. Both auricles were hypertrophied and dilated, a large ball thrombus being found in the left auricle. The tricuspid valve admitted four fingers. Thickening of the cusps of the aortic valve was present, their edges being adherent and giving rise to some stenosis. The mitral cusps were thickened and shortened, with adherent edges leading to stenosis of the funnel type. Thickening of the chordae tendineae was pronounced. The lungs showed cyanotic induration. Numerous large and small infarcts were evident, especially at the bases. Some were suppurative. The pleurae were studded with miliary calcified plaques 1 to 2 mm. in diameter. Nodules of bone in the lung parenchyma, described below, were neither seen nor felt. The spleen was enlarged, hard, and dark red, and there was moderately severe chronic congestion of the liver. There was also congestion of the mucosa of the stomach and of the renal parenchyma. The brain was not examined.

Microscopical Appearance.—Well-marked chronic congestion was seen in the lung substance. The interstitial tissue carrying the vessels showed some fibrous increase, with large numbers of pigment-carrying cells. Throughout the lung substance were seen numerous rounded nodules of bone with irregularly crenated outlines, many showing a concentric lamellar appearance (Fig. 2). The bone was mostly well calcified, but many nodules had a calcified centre with peripheral additions of osteoid tissue. This was well seen in the subpleural plaques, which showed an inner calcified and an outer osteoid zone. Vessels were present in the bone, but no medullary cavities were seen. The size of the nodules was several times that of an alveolus. A striking feature was that most of these nodules had no fibrous surround and under the microscope gave the appearance of lying free in the lung substance. In some areas, however, the bone was embedded in fibrous tissue containing pigment-laden phagocytes. The vessels in the interstitial tissue of the lungs showed no abnormality.

Discussion

The aetiology of the condition is obscure, and is likely to remain so until more cases are discovered. Past rheumatic infection with advanced mitral stenosis is invariable. Cases which have come to necropsy have all shown some degree of chronic passive congestion of the lungs. The question arises whether this alone can give rise to disseminated ossification or whether another factor—e.g., rheumatic pneumonia—is necessary to produce foci of necrosed or poorly vascularized tissue in which calcification and ossification can take place.

In the above case there is not sufficient histological evidence to warrant the presence of any other aetiological condition than chronic passive congestion. It is suggested that the bone may arise from organization of congestive haemorrhages or of intra-alveolar collections of pigment-bearing phagocytes. It should be appreciated that rheumatic pneumonia as an entity is not universally accepted.

My thanks are due to Dr. M. M. Deane for permission to publish the case, to Dr. A. C. Counsell for the pathological report and for advice and criticism, to Dr. D. G. Arthur for the radiograph, and to Mr. D. A. Vinten for the photograph.

PULMONARY LESIONS IN RHEUMATOID ARTHRITIS

BY

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[WITH PHOTOGRAVURE PLATE]

The paper by Ellman and Ball (1948) on "rheumatoid disease" with lung lesions will no doubt provoke many observers to report similar experiences. We have so far regarded as unique a case of juvenile rheumatoid arthritis in which a transient diffuse pulmonary lesion formed an intimate part of the disease, which was severe and progressive. We have not made an exhaustive study of the formidable literature, but the inquiries we have made have not produced any serious study directed to this aspect of the disease.

The case mentioned was that of a boy aged 6, weighing 34 lb. 12 oz. (15.76 kg.), in whom the pulmonary episode was heralded by a mild tonsillitis but was symptomless except for a slight increase in malaise. Intermittent pyrexia over eight days increased to 101.8° F. (38.8° C.) and subsided by lysis over a similar period. There was no leucocytosis or eosinophilia. The blood sedimentation rate, which had been 80 to 100 (Westergren) over many months, fell to 15 on one occasion at the height of the fever, rising again almost immediately afterwards. This boy was in hospital throughout in a separate cubicle, and his Mantoux reaction was negative before and after the incident. The radiographs show the condition of his lung in November 1947, four months before the onset of the lung condition on March 3, 1948, at the height of it; and on April 6, when it was resolving (Plate, Figs. 1, 2, and 3). Pulmonary congestion from left heart failure, possibly precipitated by a blood transfusion given three weeks before, was considered as a possible explanation of the attack, but this idea was rejected because of the absence of any evidence of heart disease and the rapid recovery without treatment. During this transfusion, the latest of several, an extensive urticarial rash appeared. In an earlier transfusion there had been rather more severe allergic symptoms. The further history of the case is as follows

Case History

A boy aged 6 was admitted to hospital on Dec. 12, 1946. He was the youngest of six children, and his parents and sibs were all healthy. In November, 1945, he had scarlet fever, followed by otitis media. He then remained well until August, 1946, when swelling of various joints occurred, each lasting for only a few days. There was pain on movement, but no tenderness. From time to time all the joints of his body except those of his hands, feet, and spine, were affected. He was febrile during the attacks of pain, he lost weight, and his energy and appetite decreased.

At the time of admission there was swelling of the right ankle and right knee, but little interference of movement and no tenderness. He was afebrile. There was slight generalized adenopathy but no apparent enlargement of the spleen then or subsequently. The liver, however, was always palpable. A diagnosis of juvenile rheumatoid arthritis was made, and he was given two courses of gold treatment with a maximal single dose of 25 mg. (total, "myocrisin" 212 and 210 mg.). During the next year he remained in hospital, and the disease was steadily progressive. Profound muscle-wasting occurred, and there was some limitation of movement at the wrists and severe osteoporosis with a tendency to periostitis in the small bones. Anaemia was a persistent feature and was only slightly improved by treatment

which included repeated small blood transfusions. After about six months of observation the small joints of the hands became involved. He tended to get urticaria after transfusions, and on one occasion had symptoms suggestive of a mild anaphylaxis during a transfusion, there being no evidence of group incompatibility. Improvement in general condition followed a high-protein diet (2 g. per lb. body weight). The sedimentation rate during the earlier period of observation fluctuated between 20 and 30 mm., but later was consistently in the neighbourhood of 100, and after August, 1947, the only observation made of a sedimentation rate which was below this level was on March 3, 1948 (15 mm. at one hour), during the episode of pulmonary involvement. This was unfortunately not repeated at the time. His Mantoux reaction up to 1 in 100 was tested from time to time and was always negative. The white cell count was persistently low. The serum proteins were found to be low (albumin 1.45, globulin 5) in August, 1947, and following high-protein diet increased to albumin 5.4, globulin 2.5. This effect was produced some months before the pulmonary episode. Estimates of serum calcium, phosphorus, and serum iron, and urinary analyses, were all within normal limits.

When last seen (August, 1948) the boy's condition was unchanged. He was at this time transferred to an orthopaedic centre.

Discussion

We agree with Drs. Ellman and Ball in considering the lung condition to be a part of the allergic state, of which the entire symptoms of rheumatoid arthritis are also manifestations. The linkages suggested between acute rheumatism, rheumatoid disease, Henoch's purpura, arthritis, and possibly glomerulonephritis may well turn out to be too nebulous as a theory, but, as in the reticuloses, a conception which postulates a synthesis of phenomena which are similar in some part of their characters may well be profitable, and should lend itself to critical examination and experiment in a number of ways.

Hypothetically, the course of events might be as follows: A parasite, presumably a streptococcus, is introduced for the first time to an individual. In infancy he reacts to it according to his genetic constitution and according to the degree to which this has been influenced by humoral factors derived from his mother's circulation via the placenta. In his tissues this first contact is "sensitizing," and by analogy with tuberculosis the tissue reaction will be "productive," confining, and healing, and will establish a tissue and humoral pattern. For most individuals this process will proceed to a satisfactory immunity; for some it will be incomplete, either generally or locally. These latter are the potential victims of rheumatic disease. The groups will merge into each other; individual reaction will proceed at varying speeds and in varying degree, and will be manifested in different ways according to the intensity of subsequent contacts. There is a higher incidence of rheumatic fever in the children of families in which other manifestations of rheumatoid disease are present, which suggests that the failure of the immunity reaction to proceed to completion is in part decided by genetic constitution.

The universal experience of streptococcal infection makes it unlikely that the chances of contact provide the main cause of differences in incidence. Environmental differences, of which nutrition is probably the most important, cannot be ignored. The decreased incidence of acute rheumatism has coincided with the provision of school milk and meals and the introduction of food subsidies and rationing. Chemotherapy may also have had a modifying action. The response of the sensitized individual to secondary contact would correspond to the exudative phase of tuberculosis and, as in tuberculosis, might be initiated by autogenous activation under the stress of different circumstances, such as nutritional defect. The silent period of the first three to five years of life is the period of developing sensitivity, with school life introducing increased opportunity for streptococcal infection. Reinfection, autogenous or exogenous, in the sensitized but non-immune child may then show itself in various ways: (1) polyarthritis and the specific cellular reaction of the Aschoff nodule in heart, skin, blood vessels, etc., constituting the acute rheumatic attack; (2) in the basal ganglia as chorea; (3) as localized tissue reaction in the capillaries, as in the Henoch–Schönlein complex, and possibly in the glomerular tufts as nephritis; (4) in the arterial wall as periarteritis nodosa; and (5) in the lung as rheumatic or rheumatoid pneumonia.

Such a thesis can probably be tested in a number of ways—by a critical examination of heredity in rheumatic disease, by a study of the influence of nutrition and chemotherapy in the course of streptococcal infection both in animals and in man, by further efforts to establish a satisfactory test of sensitivity, and by observation of its application in groups of children.

Acknowledgments are due to Dr. J. Bracken, radiologist, and Mr. R. G. Pearman, photographer, for their co-operation.

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ENDOMETRIOSIS OF THE GROIN

REPORT OF THREE CASES

BY

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[WITH PHOTOGRAVURE PLATE]

Swellings of the groin are an everyday problem in diagnosis to many doctors. Endometriosis at this site is uncommon, and when such a case is encountered its true nature may be overlooked if one is unmindful of the possibility. Lyall (1945) describes a case of inguinal endometriosis in a housewife, who, on her doctor's instructions, wore a truss over the lump for six years. The following three cases, two with inguinal lumps and the third with a femoral lump, are recorded as interesting examples of this unusual condition.

Case 1

A married woman aged 41, with two children, was admitted to the Radcliffe Infirmary on Dec. 2, 1941. About 22 months previously, on the day before a period was due, she first noticed a lump in the right groin. It rapidly swelled up until it was "nearly as big as an egg" and was very painful. On the last day of the period it began to shrink and became "not much bigger than a pea." After that she had a clear warning of an approaching period by the onset of pain, tenderness, and swelling of the lump on the preceding day, but the swelling did not again reach its initial size. During the period walking increased the symptoms; at the end of each period the swelling diminished and the symptoms subsided.

On examination a firm, mobile, finely nodular lump about 1½ by ¾ in. (3.75 by 1.88 cm.) was found in the right groin at a site just lateral and superior to the pubic tubercle. It was not adherent to skin or deeper structures and there was no impulse on coughing. Examination of the pelvis revealed no abnormality, and all other systems were normal.

On Dec. 4 Mr. Stallworthy made an incision over the mass, and, finding it intimately fused with the surrounding tissues, he excised it completely. Subsequent wound healing was uneventful.

Histological Report.—"The section shows ectopic endometrium both in lymph-nodal and connective tissue. Most of the tubules are irregular and non-secretory in type, but a

few show subnuclear vacuolation. There is very little haemorrhage, but here and there can be seen groups of iron-containing histiocytes from old haemorrhage. *Endometriosis.*"

As excision was thought to be complete, no further treatment was given. For eighteen months she was completely free from symptoms, but in July, 1943, a lump reappeared and became tender at the periods. It was about 1½ by ½ in. (3.75 by 1.25 cm.) in size, and was situated in the region of the right external inguinal ring, beneath the scar of the previous excision. Operation and radium menopause were considered, but neither was needed, as after a further two months she had no more pain in the lump at her periods. The mass gradually faded and gave no further trouble. When seen on April 20, 1948, she had, except for the scar, no sign of any previous trouble at the right groin. Menstruation was still present and unaltered.

Case 2

A married woman aged 47, with two children, was admitted to the Radcliffe Infirmary on Jan. 5, 1948. About two years before, when leaning against a table, she first became aware of tenderness in the right groin, and on feeling this region she found a lump. Since then it has increased in size very slightly. At first it was painful only when pressed upon, but gradually at period times she became aware of it even without pressure. During the past two or three months it ached acutely for one or two days before the period began, especially when the thigh was drawn outwards or when walking uphill. The aching abated with the onset of the menstrual flow. It also "seemed to become two or three pieces instead of one lump." Menstruation had been normal except for one period of amenorrhoea eight months previously. There had been no intermenstrual pain or discharge, no abnormal urinary symptoms, and no rectal bleeding.

On examination a hard nodule about 1 in. (2.5 cm.) in diameter was found in the region of the right femoral canal exactly at the site where a small femoral hernia would present. It was not adherent to skin, but was firmly attached to the underlying structures. The surface of the tumour was finely nodular and at two points the nodules were more distinct. No abnormalities were found in any other system. Mr. Stallworthy kindly reported as follows: "On careful palpation it could be detected that the surface of the tumour is finely craggy. It is not a surface characteristic of a gland involved by secondary growth, but is much more in keeping with the diagnosis of adenomyosis. Pelvic examination reveals an otherwise healthy parous pelvis. This is an unusual case, and while I have little doubt of the diagnosis being correct I feel that a biopsy should be performed."

On Jan. 9 I performed a biopsy and found that the mass consisted of dense fibrous tissue embedding multiple pin-point areas of haemorrhage. The site was consistent with that of a femoral hernia, but I did not trace the abnormal tissue up to the peritoneal level. There was no capsule, union with the surrounding tissues resembling that of a scirrhous carcinoma of the breast. As the mass was inseparably adherent to the femoral vein only the projecting portion of it was removed.

Histological Report.—"Scarred lymph node and tissue resembling endometrium with large swollen tubules and a few more or less normal tubules with hyperplastic epithelium. Everywhere there is infiltration with small round tissue-reaction cells. *Endometriosis*" (see Plate).

Two weeks after the biopsy deep *x*-ray therapy to the site of the lesion was started, in all 200 r being given on ten occasions. In the ensuing three months there was no further pain and the induration gradually subsided. When the patient was last seen (April 20) all trace of the lesion had vanished.

Case 3

A married woman aged 37 was referred to me by my colleague, Dr. A. M. Cooke. The history obtained in the out-patient department was that three years previously she had noticed a lump about the size of a cherry in the right groin. For two years it had given no symptoms, but in the last year it had at times become tender to touch and distinctly painful if pressed upon. Occasionally she had felt a pricking sensation from it. The swelling had not increased much in size, but it felt slightly more prominent on those occasions when it became more tender. She would not admit, even on direct questioning, that the swelling had been more painful or larger at her periods, but it was always painful when pressed on during intercourse. Her periods were regular and without pain. There was no leucorrhoea. Though wishing for a child, she had not conceived during seven years of married life.

The patient was of normal intelligence. In the region of the right external abdominal ring there was an oval lump about ¾ by ½ in. (1.88 by 1.25 cm.). Until both sides were compared it was not easy to feel, as it lay well into the external inguinal ring. It was firm and slightly tender, not adherent to skin, and could be moved in a line at right-angles to the inguinal canal, but it was fixed in the line of the canal. There was no impulse on coughing. The lymph nodes of both groins and axillae were slightly prominent but within normal limits. No abnormality was revealed by pelvic examination.

On May 25 she was admitted to the Radcliffe Infirmary—a period had just started. She said the lump was more painful than when seen in the out-patient department a week previously, and I found it slightly enlarged and distinctly more tender. Mr. Stallworthy found no pelvic abnormality, and he agreed to the need for excision.

On May 26, under a general anaesthetic, I made a 2-in. (5-cm.) skip-crease incision over the mass and found it occupying the external abdominal ring. At its upper end the round ligament was seen running into the oval mass, like the stalk into the bulb of a spring onion. The whole mass was fused to the surrounding tissue. I excised the mass together with about ¼ in. (0.6 cm.) of round ligament and closed the wound. On incising the lump, which was firm to cut, multiple points of dark blood oozed from a fibrotic surface.

Histological Report.—"The tissue about the tumour consists of fat, connective tissue, and blood vessels, with nervous fibres and some striped muscle fibres. The tumour within it consists of fibrous tissue with loose collagenous strands and smooth-muscle fibres arranged in twisted fashion about several distinct islands where there are endometrial tubular elements with a thin, but nevertheless characteristic, stromal layer. The stroma varies slightly from island to island, and in some parts is vascular and is breaking down with the tubular elements in a manner closely resembling normal menstruation. The tubular epithelium is non-secretory. In the lumina of the disintegrating tubules are remnants of secretory cellular dissolution, which has probably occurred recently in a period of pro-gestational activity of a kind resembling or identical with a normal menstrual cycle in this vicarious area of endometrial growth. *Non-secretory endometrium—bleeding in tumour of smooth muscle and fibrous tissue : endometrioma.*"

When seen on June 22 the wound had healed and there had been no further trouble in the area concerned.

Comment

The diagnosis in cases such as these is strongly determined by the history, so that when any strange tumour about the groins or abdominal wall is encountered a possible relation of the symptoms to the menstrual cycle should be sought. These three cases illustrate three distinct types of history. In Case 1 the symptoms started violently with a rapid egg-sized swelling appearing in the groin at the onset of a period, the lump subsequently shrinking, then enlarging again in cyclic fashion with the periods. In Case 2 the lump was present for a few months before it became painful at the periods, and had it been seen at that stage the diagnosis could have been settled only by exploration. But in Case 3, in a woman of normal intellect, vague remission and exacerbation of symptoms were noticed by the patient, but she denied any worsening of her symptoms during menstruation. Indeed, there may have been none, but that is unlikely, especially as the lump was distinctly more tender when I examined her at the onset of a period than it had been a week before. This patient did not worry too much about herself and "had not bothered much about it." But the point is clear that a patient may

deny any association or aggravation of symptoms with her periods.

Commoner physical features of superficial endometriosis are a finely craggy surface and some degree of fixity to deeper structures, and the appearance, on excising the mass at biopsy, of dense fibrous tissue fused with the surrounding tissues and showing pin-point areas of haemorrhage.

The treatment of this type of lesion presents none of the grave problems of pelvic endometriosis. If the mass can be totally excised with ease, then that is the best remedy, but if there is dense fibrous attachment to important neighbouring structures it does not call for the extremes of wide excision or minute dissection. The lesion will respond readily to local deep *x*-ray therapy, which destroys the aberrant endometrium. Should the bimanual examination in such cases as these reveal pelvic endometriosis, then artificial menopause must be considered, which, if established, would subdue both lesions.

Endometriosis in relation to the round ligament in the inguinal region is rare but well established. To find the disease creeping on to the thigh as in Case 2, though exceptional, is not such a curiosity as the case recorded by Schlicke (1946), who removed a nodule of endometrial tissue from the back of the left thigh of a Filipino woman.

Supporters of the "implantation" theory might consider the origin in Case 2 as a deposit of endometrium in the sac of a femoral hernia, especially as for some months after it first appeared the swelling was not painful at the periods. Those favouring a "lymphatic deposit" theory find support in the fact that in the first two cases the histological examination revealed the endometriosis to be lodged in lymphatic glands, but whether by deposit or by direct invasion of the glands is undefinable. The recurrence after excision in Case 1 supports the thesis of another lymphatic metastasis. To those adhering to the theory of "metaplasia" the last case is a solace, as no lymphoid tissue was found on histological examination and the lesion was growing in and surrounded by the distal end of the round ligament.

Summary

Three cases are described in which aberrant endometrial tissue occurred in the groin. All cases presented with a lump, which was inguinal in two instances and femoral in the third. Two of these cases illustrate that when an unusual mass is encountered at the groin it is essential to inquire into the possibility of aggravation of swelling and pain at the periods. The other case shows that the patient may deny any alteration of her symptoms at her periods. The characteristic physical features of a fine craggy surface with some degree of fixity to deeper structures may then be the only guide to the real nature of the lesion, and in such cases, as in fact in most instances, biopsy is essential for accurate diagnosis.

The management of an isolated lesion or one associated with pelvic endometriosis is outlined, and the possible methods by which endometrial tissue appears in the groin are briefly discussed.

I wish to thank Mr. J. A. Stallworthy, who treated Case 1 and advised on Cases 2 and 3, and who gave me much help throughout. Dr. G. A. C. Summers kindly supplied the photomicrograph.

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In the first six months of last year more children were immunized against diphtheria by local authorities than in any half-year since the end of the war, states the Ministry of Health. They numbered 347,000, bringing the grand total for England and Wales to 7,567,574. The total for those under five during the first half of the year was 288,000. Before the war there were on the average more than 50,000 cases of diphtheria a year and 2,900 deaths. In 1947 there were slightly over 10,000 cases and 244 deaths.

SOLITARY PLASMOCYTOMA OF BONE
REPORT OF A CASE

BY

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[WITH PHOTOGRAVURE PLATE]

Solitary plasmocytoma of bone is a rare condition, and this case is presented not only because of its rarity but also because of its location in a rib, a site of involvement never before reported.

The number of cases traced in the literature is about 40, but it seems futile to assert that the case here recorded is the 41st, as whole batches of cases reported in unobtainable journals may have been missed. On the other hand, strict criteria of diagnosis of solitary myeloma will induce one to discard a certain proportion of cases which have been described as such.

Case History

A married woman aged 60, with two children, was first seen by Mr. A. R. Banham, consultant surgeon, at the Northampton General Hospital. She complained of pain in the right shoulder of six months' duration and of a lump in the right neck which had been present for six weeks and was gradually increasing in size.

Clinical examination revealed a coarse crepitus in both shoulder-joints, but there was a full range of movement. A mass was present behind the right clavicle, being attached to deeper structures. The Wassermann reaction was negative, and urinary examination revealed: urates, ++; Bence-Jones proteose, *nil*; other proteins, *nil*.

A chest skiagram (Plate, Fig. 1) which was taken before any treatment was started showed the right apical area to be hazy, and the right first rib had been almost completely destroyed. *X*-ray examination of the remainder of the skeleton revealed no abnormality. A biopsy was performed, and the patient was subsequently referred to the radiotherapy department.

Pathological Report.—"The tumour is composed mainly of small round cells with little pleomorphism. The nuclei stain deeply, and in some of the cells the cytoplasm is sparse. The cells tend to be arranged in clusters with a scanty stroma. The majority of the cells are typical plasma cells" (Fig. 2).

Treatment

The patient was seen in the radiotherapy department by Dr. B. Jolles, consultant radiotherapist. A healed scar was present in the right supraclavicular fossa, where a hard mass measuring 7 by 5 by 5 cm. was found, deeply infiltrating the underlying structures and fixed to the medial half of the clavicle. The chest, both breasts, and abdomen were found clinically clear.

A course of deep *x*-ray treatment was given through one anterior and one posterior oblique supraclavicular field, the physical factors being: 180 kV, 10 mA, H.V.L. 1.25 mm. Cu, F.S.D. 40 cm., 15 by 10 cm. applicators. A skin dose of 3,500 r was given on the posterior supraclavicular field in 21 days and of 2,000 r on the anterior in 13 days, the overall time being 22 days. An exudative epithelitis which ensued took just over eight weeks to heal completely, and four months from the end of this treatment the mass had completely disappeared.

Throughout the follow-up period the patient remained perfectly well, and radiographs of the affected rib taken three months and two years after treatment are shown in Figs. 3 and 4 respectively. Radiographs of the entire skeleton during this time have revealed no further lesions and Bence-Jones proteosuria has remained negative.

Discussion

This appears to be the first reported case of solitary myeloma affecting a rib, the sites involved in the previously

reported cases being: femur 15, pelvis 4, vertebrae 7, humerus 3, tibia 2, maxilla 2, sternum 1, clavicle 1, and mastoid 1.

Willis (1941), in a review of solitary plasmocytoma of bone, suggested that to establish such a diagnosis the following criteria could usefully be applied: (1) adequate pathological examination of biopsy material; (2) repeated radiographs of the entire skeleton; and (3) repeated examination of the urine for the presence of Bence-Jones proteose.

Some of the previously reported cases which did not fulfil these criteria did, in fact, subsequently develop multiple lesions. This does not mean that when first seen the lesions were not solitary, and Willis suggests that these were precocious tumours of a multiple myeloma. The lapse of time between initial diagnosis and the appearance of multiple lesions varied from three months to three years. Brewer (1948), in an article on the treatment of multiple myeloma with stilbamidine, reports a case in which the diagnosis was established by the presence of myeloma cells and plasma cells in the sternal puncture material, the radiographs of the entire skeleton showing no lesions and the urine no Bence-Jones proteose (although excess proteins were present). This would seem to indicate that repeated sternal puncture might be added to the above-mentioned criteria of Willis.

In the present case a favourable prognosis after two years appears warranted, but radiological and laboratory tests are indicated for some time in the future, since the aetiological factors in these conditions are unknown and the original underlying cause may at any time produce further lesions.

I wish to acknowledge my indebtedness to Mr. A. R. Banham, consultant surgeon, and Dr. B. Jolles, consultant radiotherapist, Northampton General Hospital, for their kind permission to publish this case; also to Mr. E. J. Pamely, of this department, for the photomicrograph and prints of the radiographs.

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INFANT MORTALITY

BY

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Many factors are known to influence infant mortality. These factors have complex interrelations, so that it is impossible to allot relative degrees of importance to them, but they may be broadly grouped into two categories: (1) conditions which affect the whole population, and (2) conditions specific to infancy. Numerous measures have come into operation during the past century which have affected the health of the infant. The gradual improvement in the general standard of living, sanitation, water supply, housing, etc., has affected the welfare of the whole population. At the same time these advances have influenced the health of the infants in two ways: (*a*) babies are born into a better environment than their predecessors, and (*b*) they are born to mothers whose standard of health is, on the average, higher than formerly.

The scheme which has been specially directed to the infant and mother grew from very small beginnings to a great national institution. The working of the maternity and child-welfare centres has been directed under three headings—antenatal, natal, and postnatal. It would be expected, therefore, to have influenced the death rate in each of the three stages of child life—by foreseeing and avoiding preventable difficulties in labour, by reducing the preventable sickness and mortality of the mothers, by reducing the incidence of prematurity and the numbers of deaths of infants and mothers from accidents of childbirth, and by diminishing the deaths from causes due mainly to lack of knowledge of maternal care. The gradual spread of knowledge of infant welfare and management has undoubtedly been a prime factor in the reduction of infant mortality.

The decline of the birth rate has also had an effect on infant mortality, but again it is not possible to gauge the extent of the fall due to this factor. Infants with brethren of school age have a greater chance of contracting the infectious diseases of childhood than babies without older sibs, so that a decrease in the size of families has reduced the amount of early infection, with its higher fatality rate. The mother of a small family has time to give the individuals more care and attention than is possible with a large family, and also she is probably in a better physical condition to do so. Thus economic, environmental, and hereditary factors play an important part in determining the chance of survival of infants.

The decline in the death rate in England and Wales during recent years, when new low records have continuously been established, has been the occasion for the inference that this fall has been due solely to present-day methods of infant care, etc., and even specific reasons have been given. The infant mortality for 1948 was only 34 per 1,000 births, a fall of 7 from the record low level of the preceding year. Judging from the trend of the death rate during this century, it is probable that the infant mortality has not yet been stabilized at this level, since a very large fall has generally been followed by a rise in the succeeding years. It seems of interest, therefore, to review the course of infant mortality during the present century so far as the data tabulated in official statistics will permit.

England and Wales, 1900 to 1947

The rate of infant mortality began to decline at the beginning of this century and has continued to fall fairly steadily up to the present day, although of course there have been some fluctuations. The number of deaths occurring in the first year of life per 1,000 live births was 154 in 1900 and 41 in 1947. The observed rates for the period 1900 to 1947 and the smoothed values obtained by fitting to them a simple exponential curve are shown in Fig. 1. The average annual rate of decline during the present century has been, from the smoothed curve, 2.58%. The trend clearly gives no evidence to support any claim that there has been an exceptional decline in mortality in the last year or two. On the other hand this curve, coupled with the fact that the general adoption by the community of new methods and improvements in child welfare takes time, makes it reasonable to suggest that the rate will continue to decline for some years even if no new advances in infant care are made.

Effects of Urbanization

In the past the conditions of life in the great towns have been conducive to a high infant mortality rate, and it seems reasonable to expect that the improvements made in the general standard of living during the last half-century would have most effect on infant mortality in such areas. It is, however, possible to trace the trend of infant deaths by urbanization for the whole country only from 1911 onwards. Prior to this year vital statistics were tabulated by registration districts, and these districts often included both town and country; moreover, deaths occurring in

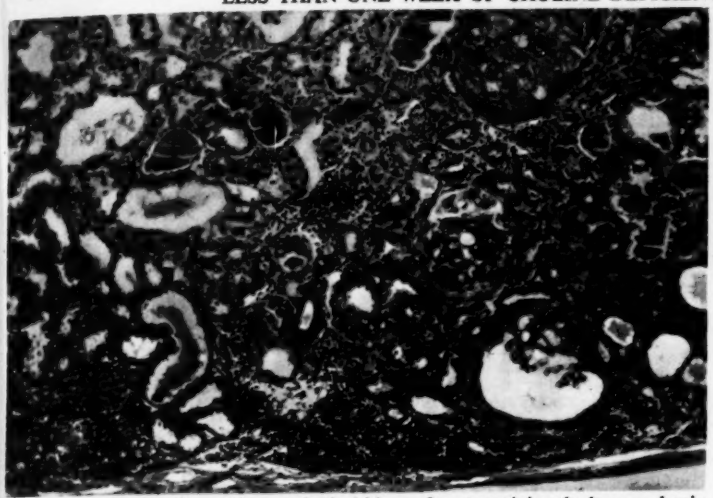


FIG. 1.—Severe parenchymal damage in the kidney of a rat surviving the haemorrhagic renal syndrome of choline deficiency. H.E. stain (× 140.)

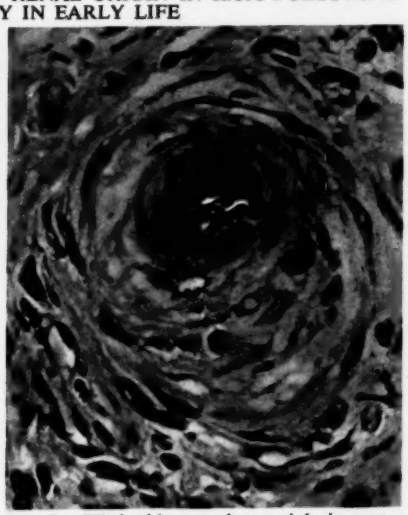


FIG. 2.—Fibrinoid necrosis: arteriole in cortex of kidney in Fig. 1. H.E. (× 600.)

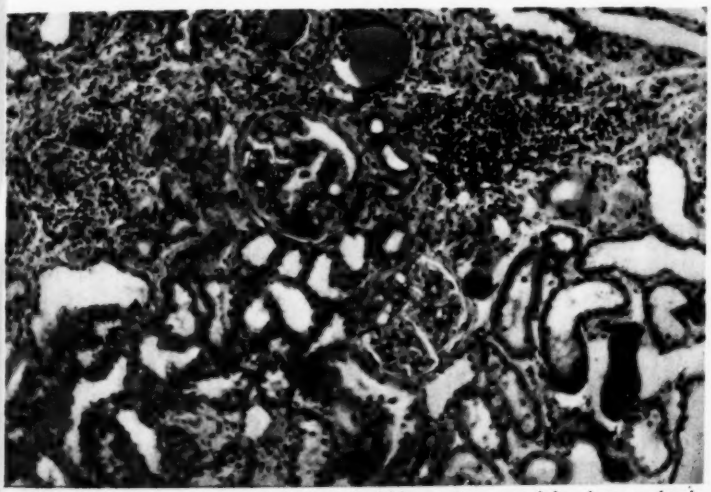


FIG. 3.—Moderate parenchymal damage in kidney of rat surviving haemorrhagic renal syndrome. Note some relatively normal tubules. H.E. (× 140.)

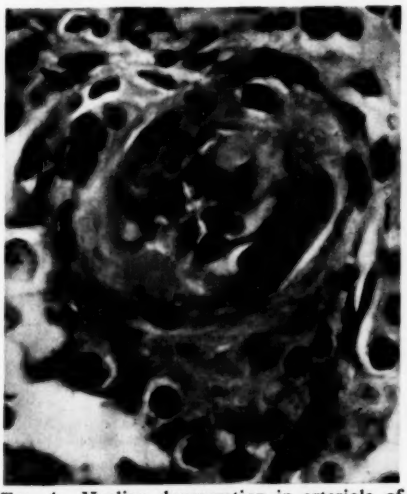


FIG. 4.—Hyaline degeneration in arteriole of cortex of kidney in Fig. 3. H.E. (× 600.)

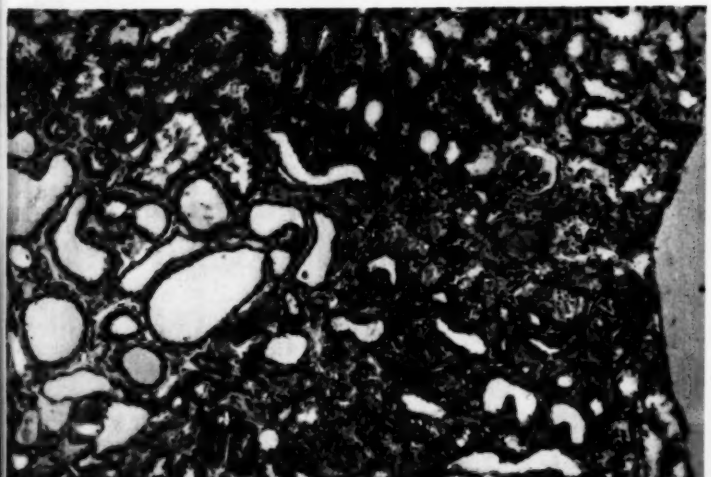


FIG. 5.—Slight parenchymal damage in kidney of rat surviving haemorrhagic renal syndrome. Note depressed cortical scar and distended tubules. H.E. (× 140.)

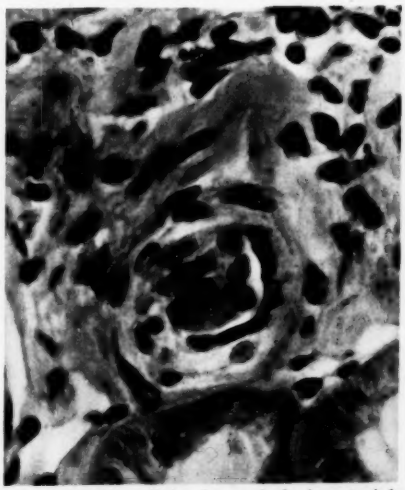


FIG. 6.—Early cellular hyperplasia in arteriole in cortex of kidney in Fig. 5. H.E. (× 600.)

W. STANLEY HARTROFT AND CHARLES H. BEST: HYPERTENSION OF RENAL ORIGIN IN RATS FOLLOWING LESS THAN ONE WEEK OF CHOLINE DEFICIENCY IN EARLY LIFE

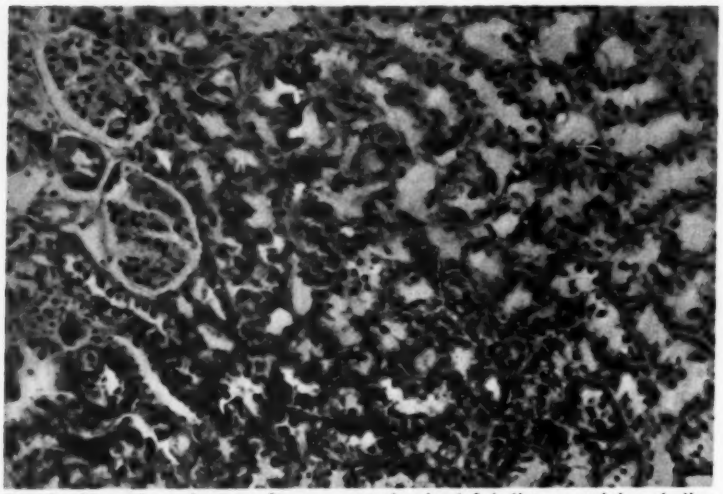


FIG. 7.—Normal renal cortex from a control animal fed diets containing choline throughout its life. H.E. (× 140.)

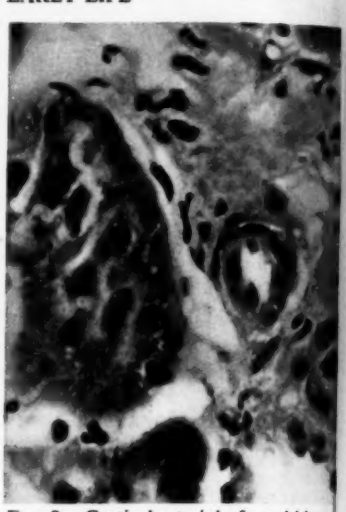


FIG. 8.—Cortical arteriole from kidney of control animal. H.E. (× 600.)

H. HOLDEN: SOLITARY PLASMOCYTOMA OF BONE

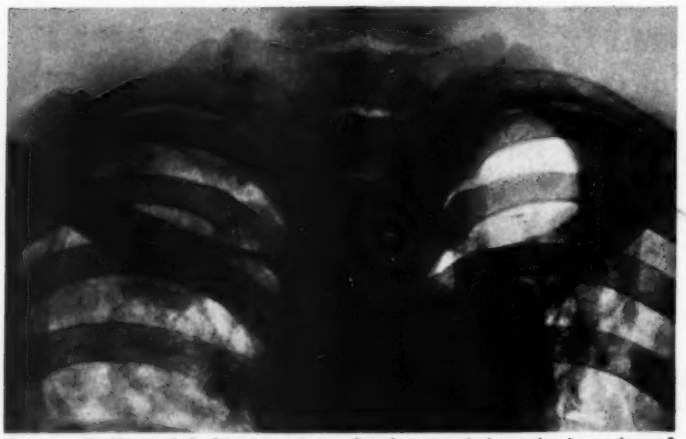


FIG. 1.—Radiograph before treatment, showing rounded opacity in region of right lung apex and almost complete destruction of right first rib.

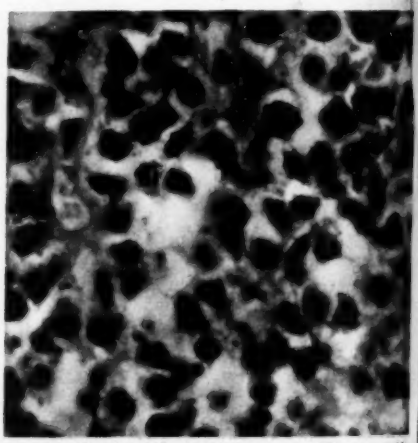


FIG. 2.—Section of plasmocytoma. Plasma cells with deeply staining nuclei. (× 500.)

FIG. 3.—Commencing regeneration of right first rib with disappearance of opacity three months after treatment.

FIG. 4.—Two years after treatment.

D. G. LEYS AND P. N. SWIFT: PULMONARY LESIONS IN RHEUMATOID ARTHRITIS

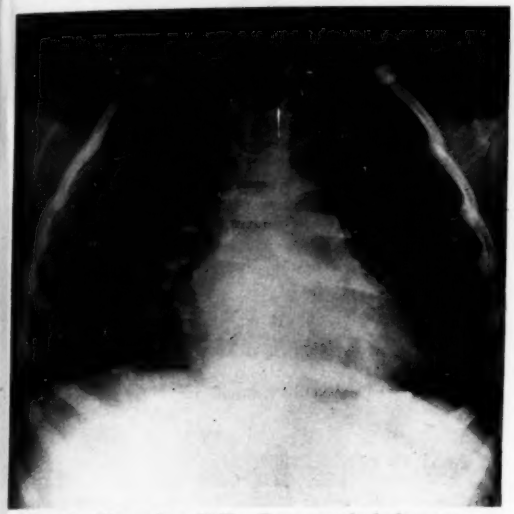


FIG. 1.—November, 1947. Four months before onset.

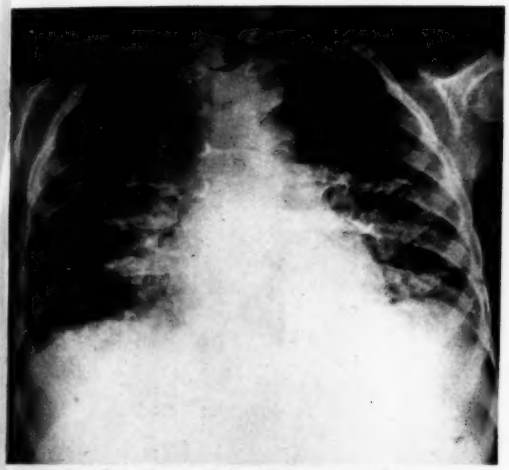


FIG. 2.—March, 1948. Pulmonary episode.

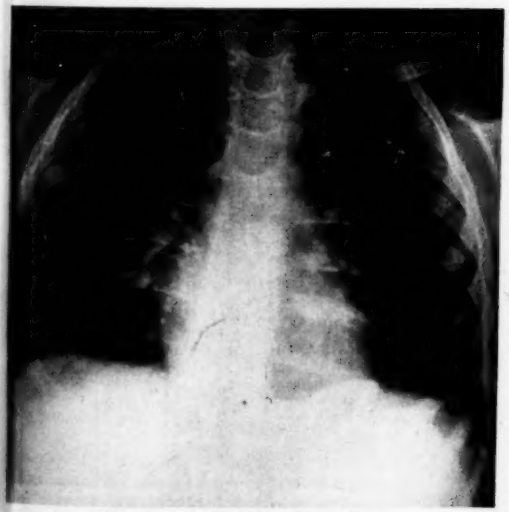


FIG. 3.—April, 1948. Resolving.

A. IAN L. MAITLAND: SEVERE HYPERTENSION WITH RECOVERY AFTER NEPHRECTOMY

FIG. 1.—Normal outline right renal pelvis. The left renal pelvis and ureter are only visible as a thin line.

FIG. 2.—Retrograde pyelogram showing on left side normal outline of the small apelvic type.

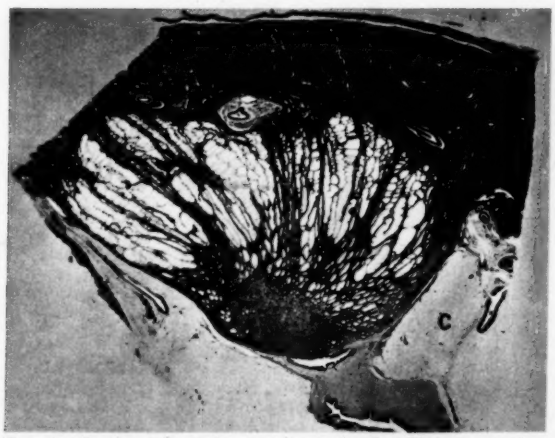
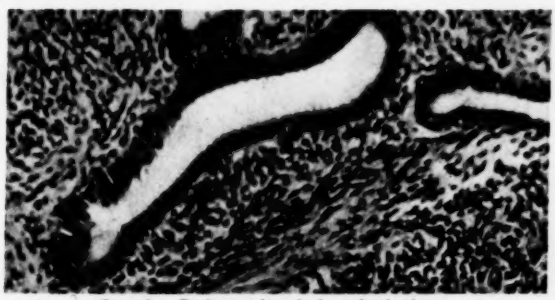


FIG. 3.—Section of renal parenchyma (× 5). Note narrowing of cortex and enormously dilated tubules filling the central area of the pyramid. C marks the cavity of the calix.

G. E. MOLONEY: ENDOMETRIOSIS OF THE GROIN



Case 2. Endometrium in lymphatic tissue.

LESLIE NANCEKIEVILL: ACUTE IDIOPATHIC PULMONARY HAEMOSIDEROSIS

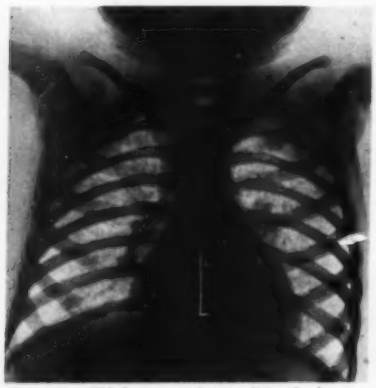


FIG. 1.—Slight mottling of both lungs in early phase.

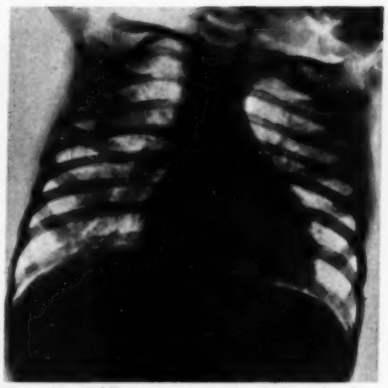


FIG. 2.—Diffuse gross reticulation in late phase.

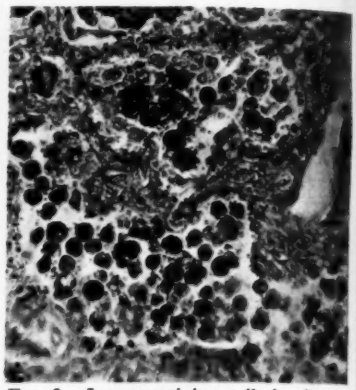


FIG. 3.—Iron-containing cells in alveoli. Prussian blue. (× 100.)

ETHEL BROWNING: BLOOD CHANGES IN LUMINIZERS

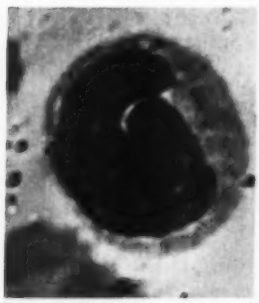


FIG. 1.—Normal monocyte of diameter 13·5μ. (× 2270.)

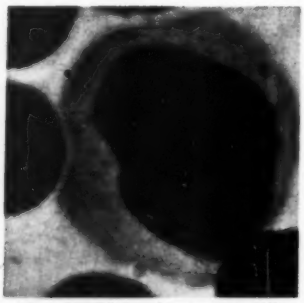


FIG. 2.—Normal monocyte of about 15μ diameter. (× 2270.)

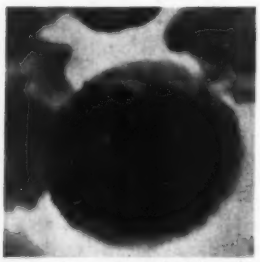


FIG. 3. — Lymphoidocytic monocyte of diameter 11·5μ. (× 2270.)

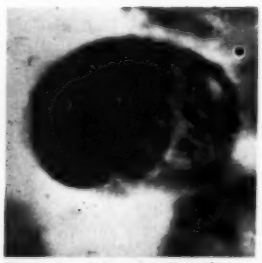


FIG. 4.—Abnormal (intermediate type) lymphoidocytic monocyte, 13·5 by 11μ.

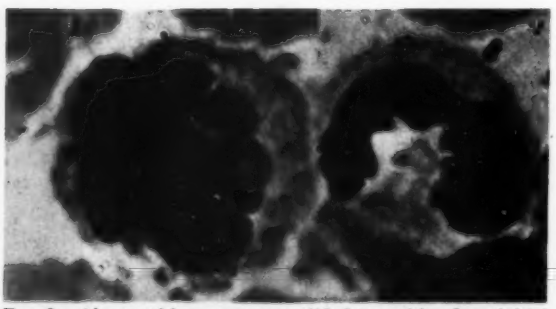


FIG. 5.—Abnormal large monocyte (18·5μ) resulting from initial stimulation of reticulo-endothelial system by ingested radioactive material. Some granularity in cytoplasm. (× 2270.)

H. M. LAWSON: DISSEMINATED OSSIFICATION OF THE LUNGS

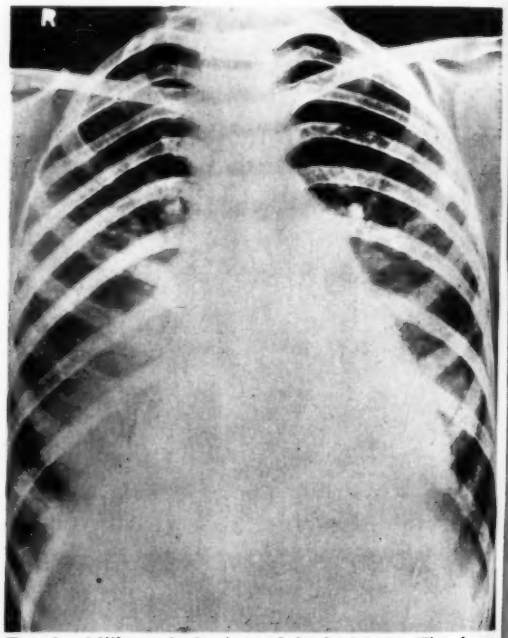


FIG. 1.—Miliary shadowing of both lungs. The heart contour is typical of mitral stenosis.

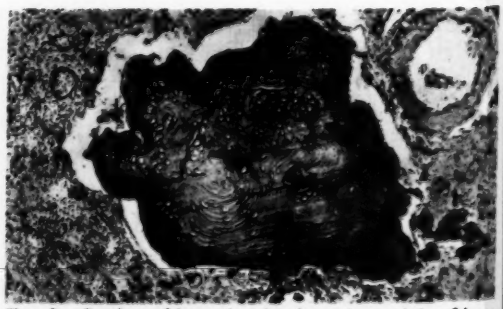


FIG. 2.—Section of lung showing irregular nodule of bone with laminations and included osteoblasts. (× 100.)

institutions were not returned to place of residence but were debited against the area in which death occurred. Since 1911 the trend of the rate in the main divisions—i.e., London, county boroughs, urban districts, rural districts—has followed a course very similar to that of the whole country. The rate at the beginning of this period was lowest in the rural districts. London and the urban districts had a rate about 20%, the county boroughs a rate approximately 50% above the rural level. The rate of decline in the rural areas has been slightly less than in the other areas, so that in 1945 the county boroughs had a rate about 25% and London and the urban districts a rate about 10% in excess of the rural level.

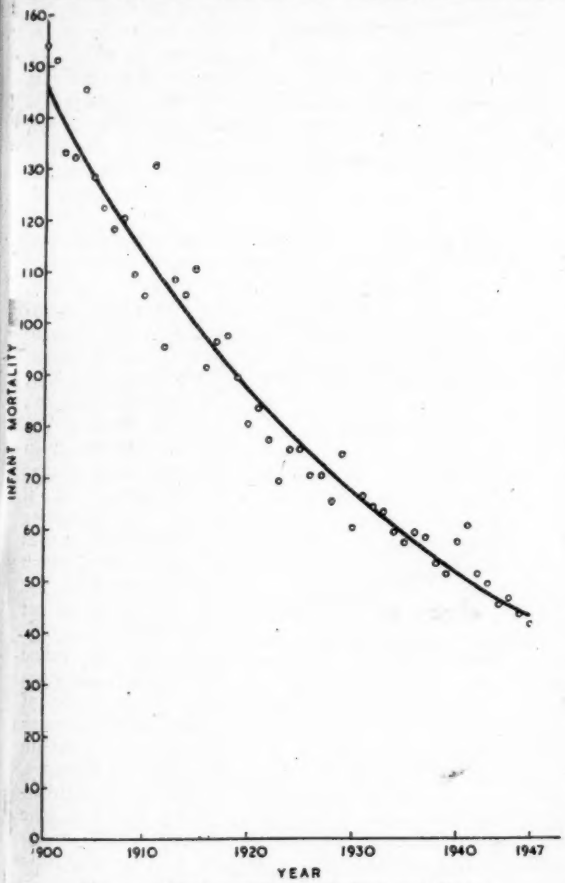


FIG. 1.—Infant mortality in England and Wales.
I.M. = $146.37e^{-0.026138x}$ (origin at 1900)

A convenient method of comparing the trends in the four aggregates is by fitting simple exponential curves. This type of curve gives a good description of the data and easily permits a comparison of the relative rates of decline and of the initial levels of mortality. The equations obtained were :

Infant Mortality, 1911–45

Area	Equation (Origin at 1911)	Average Annual Rate of Decline (%)
Rural districts	$89.81e^{-0.02296x}$	2·26
County boroughs	$122.62e^{-0.02469x}$	2·44
London	$106.01e^{-0.02498x}$	2·47
Urban districts	$103.92e^{-0.02519x}$	2·49

The rate of decline has been surprisingly similar in large cities and small urban aggregates.

Sex Differences

At the beginning of the century the infant mortality of males was about 20% greater than the rate for females. The subsequent decline has been slightly greater for girls than for boys, and now the male infant mortality is about 30% in excess of the female rate. An exponential curve, with origin at 1901, gives for the males, Infant mortality $= 156.12e^{-0.02518x}$, and for the females, Infant mortality $= 126.82e^{-0.02684x}$. These curves give an annual average rate of decrease of 2.49% for males and 2.65% for females.

Geographical Differences

At the beginning of the century infant mortality showed well-marked geographical differences, the rate progressively increasing from the south to the north of the country. The rate of decline during the past 35 years has varied between the regions, but the general picture of a higher infant mortality in the north than in the south still remains. A simple exponential curve fitted to the rates for 1911–45 gave the following equations :

Infant Mortality, 1911–45

Region	Equation (Origin at 1911)	Average Annual Rate of Decline (%)
South-west	$81.60e^{-0.02186x}$	2·16
South-east	$91.79e^{-0.02561x}$	2·53
East	$93.78e^{-0.02658x}$	2·62
Midland I	$109.15e^{-0.02524x}$	2·49
Midland II	$108.40e^{-0.02601x}$	2·57
North I	$133.85e^{-0.02430x}$	2·40
North II	$116.26e^{-0.02343x}$	2·32
North III	$125.61e^{-0.02805x}$	2·77
North IV	$125.13e^{-0.02350x}$	2·32
Wales I	$114.42e^{-0.02271x}$	2·25
Wales II	$97.81e^{-0.01895x}$	1·88

The greatest rate of decline has been in North III, and the present level of infant mortality in this region is now the lowest of the northern regions. The slowest rate of decline has been in Wales II (the northern rural counties of the Principality), and the advantage possessed by this region over the more industrial South Wales at the beginning of the period has now almost disappeared. The South-west region of England had the lowest infant mortality at the beginning of the period, but, with the second lowest rate of decline, the infant mortality in 1945 was slightly greater than that of either the South-east or the East region.

Mortality by Ages

The chance of death during the first year of life varies considerably. For all causes of death the probability of dying decreases with increasing age, although individual causes show different risks at different ages. Deaths during the first year of life were not tabulated in age groups before 1906. The course since then is shown in Fig. 2 for seven age periods. Exponential curves have again been fitted to facilitate comparison of trends, and the equations found were :

Infant Mortality, 1906–45

Age	Equation (Origin at 1906)	Average Annual Rate of Decline (%)
Under 1 day	$11.62e^{-0.00439x}$	0·44
1 day to 1 week	$13.24e^{-0.00633x}$	0·63
1 week to 1 month	$17.34e^{-0.02425x}$	2·40
4 weeks to 3 months	$23.32e^{-0.03044x}$	3·00
3–6 months	$22.30e^{-0.03370x}$	3·31
6–9 months	$19.37e^{-0.03093x}$	3·91
9–12 months	$18.16e^{-0.04556x}$	4·47

As is well known, efforts to reduce infant mortality have been much more successful in the later periods of the first year of life than in the earlier periods ; each successive age group shows a substantial improvement on the preceding

age group in its annual rate of decline. In the first two age groups—under one day and one day to one week—only a very small measure of success has been attained. Many of these deaths may be derived from non-viable births, and some of the slight decrease in mortality recorded in these age groups may be more apparent than real if the proportion of non-viable births varies with birth order: as a result of the fall in the birth rate the later birth orders do not form so large a proportion of the total births as they did at the beginning of the period. Unfortunately, data do not exist to allow study of this point.

As a consequence of this differential fall in the death rate the age structure of the infant deaths has undergone a considerable change. The proportion of all infant deaths that occur in the first week of life is now roughly 40% and is twice the proportion of 40 years ago, when it was 20%. The greatest decline in mortality has been at ages 9–12 months, with the result that this age group, which contributed one-eighth of all infant deaths in the beginning of the period, now provides only one-twentieth. It will be observed also from Fig. 2 that in the last nine months of the first year of life the curves are becoming asymptotic, so that at present there is no evidence that much further improvement in the rate at these ages is likely to take place.

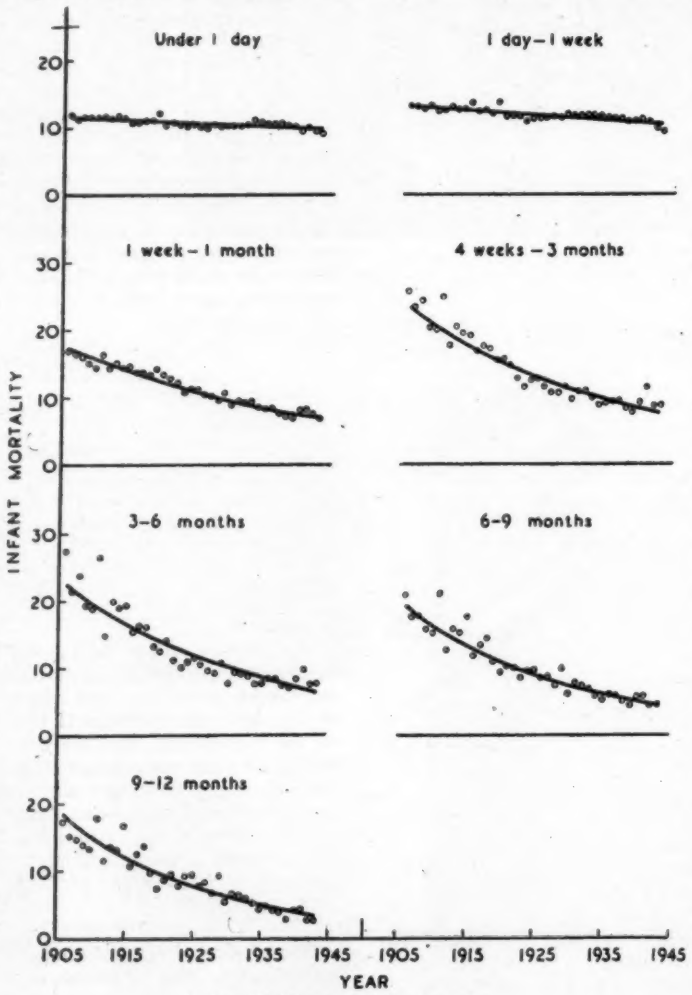


FIG. 2.—Infant mortality by age.

Seasonal Trend

Infant mortality, in common with the death rate for the whole population, exhibits seasonal differences, and its decline has been accompanied by distinct changes in that seasonal distribution. These changes can be illustrated by means of the quarterly death rates, which for the first 45 years of this century were:

Infant Mortality, Quarterly Averages

Period	March	June	September	December
1901–05	137	113	162	140
1906–10	124	98	120	128
1911–15	119	91	120	109
1916–20	116	83	75	91
1921–25	94	70	62	77
1926–30	91	60	52	69
1931–35	82	57	47	63
1936–40	73	50	42	55
1941–45	63	47	40	49

At the beginning of the period the seasonal distribution of infant mortality, with its summer maximum, contrasted with the distribution of mortality for the whole population, which had a summer minimum. The decline in infant mortality in each of the four quarters has varied very considerably, and the present seasonal distribution of the rates is similar to that shown by the death rates at all ages—i.e., the highest death rate lies in the first quarter, the rate for the fourth quarter is slightly greater than the rate for the second quarter, and the lowest rate falls in the third quarter. The quarterly infant mortalities during 1941–5 expressed as a percentage of the values of 1901–5 were 46% for the March quarter, 42% for that of June, 25% for that of September, and 35% for that of December. The very large decline in infant mortality in the September quarter is striking, and it would be interesting to examine the causes of death to find which were responsible for it. The data do not exist, though it can be said that the decline of summer diarrhoea as a large cause of infant deaths, though contributory, is not an adequate explanation. Deaths from all diarrhoeal diseases were 23 per 1,000 births in 1901–5 and 5 in 1941–5. Even if we make the assumption that all the diarrhoeal deaths occurred in the third quarter, then the infant mortality from all other disease would have decreased from 139 to 35; in other words, the rate at the end of the period would be only 25% of that at the beginning, which is the same result as that given by the original figures.

Causes of Death

The large decline in infant mortality naturally raises the question, Which diseases have been responsible for the fall? The determination of the course of mortality in infancy from a particular cause presents great difficulties. During the past 50 years the classification of causes of death has been revised several times in the light of increased knowledge, or certain conditions have been recognized as entities. In 1940 a modification was made in the method by which deaths of persons who suffered from more than one disease were tabulated. Prior to this date deaths from multiple causes were tabulated by a rule of procedure, but from this year the physician's choice of the cause of death

Table showing Quinquennial Rates of Infant Mortality by Causes in England and Wales

Period	Measles	Whooping Cough	Tuberculosis (All forms)	Convulsions	Bronchitis	Pneumonia (All forms)	Diarrhoea and Enteritis	Hernia and Intestinal Obstruction	Congenital Malformation	Prematurity	Injury at Birth	Violence	Other Causes	All Causes
1901–05 ..	2·67	5·21	5·91	14·59	11·61	11·38	7·29	0·51	4·33	20·25	0·73	2·41	51	138
1906–10 ..	2·43	4·55	4·41	11·83	8·97	10·80	7·30	0·50	4·94	19·92	0·96	2·19	38	117
1911–15 ..	2·94	4·08	3·08	8·81	8·30	10·90	19·24	0·54	3·85	19·69	1·13	1·76	26	110
1916–20 ..	1·76	2·99	2·00	6·79	7·95	10·45	9·34	0·61	4·04	19·33	1·13	1·19	22	90
1921–25 ..	1·30	2·94	1·39	4·38	5·36	10·78	8·13	0·62	4·32	18·45	1·40	0·94	16	76
1926–30 ..	1·23	2·55	1·07	2·79	3·77	10·50	6·47	0·62	4·94	17·96	1·89	0·98	13	68
1931–35 ..	0·90	1·74	0·83	1·93	2·69	9·48	5·42	0·58	5·85	17·23	2·35	1·19	12	62
1936–40 ..	0·52	1·16	0·59	1·27	2·29	8·57	4·75	0·46	6·11	15·26	2·65	1·24	10	55
1941–45 ..	0·32	1·03	0·51	0·83	1·88	8·08	4·93	0·37	5·97	12·70	2·45	1·51	9	50
Rates expressed as a percentage of those during 1901–05:														
1901–05 ..	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1906–10 ..	91	87	75	81	77	95	100	98	114	98	132	91	75	85
1911–15 ..	110	78	52	60	71	96	264	106	89	97	155	73	51	80
1916–20 ..	66	57	34	47	68	92	128	120	93	95	155	49	43	65
1921–25 ..	49	56	24	30	46	95	112	122	100	92	192	39	31	55
1926–30 ..	46	49	18	19	32	92	89	122	114	89	259	41	26	49
1931–35 ..	34	33	14	13	23	83	74	114	135	85	322	49	24	45
1936–40 ..	19	22	10	9	20	75	65	90	141	75	363	51	20	40
1941–45 ..	12	20	9	6	16	71	68	73	138	63	336	63	18	36

was accepted. This alteration broke the continuity of the mortality rates, and in general it is impossible to recast the older grouping of causes of death into the modern form.

Despite these serious limitations, which prevent an exact comparison being instituted, an attempt has been made to obtain the trend of mortality for the numerically important causes of death during the present century, and the rates are given for quinquennial periods in the accompanying Table. The table shows that a substantial decline in mortality has been recorded for most causes of death. The exceptions to the general decline are congenital malformations and injury at birth, both of which have shown an increase during the period. The mortality from convulsions provides the most spectacular fall: the death rate in 1941–5 was only 6% of the rate in 1901–6. The fall in the pneumonia death rate has been quite small; and deaths from this cause formed 17% of the total infant mortality in 1945, compared with 6% in 1901. Mortality from prematurity and from diarrhoea and enteritis has been almost halved during the period, but both are still very important causes of death and in 1945 accounted for 24% and 11% respectively of the total infant mortality. The decline in the death rate from prematurity was slow until the last decade. Mortality from violence decreased during the first half of the period, but then increased. Although the death rate from violence is small it represented 1,012 deaths in 1945. The largest causes under this heading in 1945 were: suffocation, 600; lack of care of the newborn, 195; burns, 41; homicide, 63.

These trends of the death rates by individual causes are interesting and provide material for considerable speculation. Any hypothesis formed can only be a matter of speculation, since the data in general do not permit of any further analysis being made. Some of the increase in the death rate from congenital malformations may be due to the larger proportion of first births in the total births. This is a possible explanation if the birth of a badly malformed child is a deterrent from having further children, but the probability of congenital deformity increases with increasing age of the mother, so that from the trend of the birth rate during the period a decrease in this cause would have been expected. The increase in the mortality from injury at birth might also be explained in part by the increase in primiparae among the mothers. Any satisfactory explanation of the rise in the death rate from injury at birth is difficult, since during the period of increasing mortality there has been an increase in the number of institutional confinements. It would have been expected that with the increase in deliveries in hospital the mortality from this condition would have declined. A similar trend for this cause of death has been shown by the United States of America, where the death rate from injury at birth rose from 3.9 in 1920 to a peak of 5.3 in 1930, and then declined very slightly.

Summary

The rate of infant mortality in England and Wales in 1947 was 41 deaths per 1,000 live births, a figure less than one-third of that recorded at the beginning of the century. The decline in the rate has been greater among girls than among boys, greater in the urban than in the rural districts, and, as is well known, much greater in the later months of the first year than in the neonatal period. Regional differences continue to exist. The seasonal distribution of infant deaths has been completely changed: at the beginning of the century the highest rate lay in the September quarter; now that quarter has the lowest rate. A large improvement in mortality has been recorded for infectious diseases, bronchitis, and convulsions. The death rates for pneumonia and for prematurity are still more than one-half the rates of forty-five years ago. Mortality from congenital malformations and from injury at birth has tended to increase during the period reviewed.

Medical Memorandum

The Oxford Vaporizer in the Hands of Midwives

"Trilene" administered by way of the Oxford vaporizer has been in constant use for over two years in the midwifery department of the Guernsey Hospital. More than 1,400 patients have had the benefit of trilene, and approximately 50% of these did not have a doctor in attendance at any stage of the confinement. There is no resident doctor at the hospital. This statement may well bring forth the censure of eminent anaesthetists. It is chiefly to them that this short report is addressed, for it is within their power to spread the benefit of trilene to thousands of midwives and their patients.

In April, 1946, patients were given trilene by way of the vaporizer under close personal supervision. By June, 1946, all the doctors working in the midwifery department had consented to its use by the gas-air-trained midwives for their cases. It has continued to be an unqualified success.

First a warning against one pitfall, admittedly a serious one. The rubber-flap type non-return valve incorporated in the expiratory-valve tube becomes unserviceable after about six months. As a result patients who were becoming distressed and were not obtaining analgesia were found to be inhaling and re-inhaling their own breath. Since those who administer it have been taught to test the valve this has not recurred. Another small point is that the patient occasionally has inadvertently screwed up the expiratory valve. This does not

happen now that the valve thread is wrapped with cotton to prevent closure.

What are the supposed dangers and disadvantages of the method in the hands of midwives?

DISADVANTAGES

1. Overdosage is evidently the bugbear. At the start I impressed upon them that under no circumstances should they exceed 1.5% trilene (7.5% on the ether calibration). A mark was fixed at this point, beyond which they must not go. To my surprise I have never found an unsupervised midwife using such a high percentage. This is understandable when we consider that during a normal labour midwives want a patient who is co-operative and who understands what she is told.

2. Delay in labour is not experienced provided the patient is not pushed to the stage at which the voluntary muscles no longer help the uterus.

3. No adverse effects on the child have ever been noted.

ADVANTAGES

The advantages of the method are numerous; the following are but a few:

1. In the vaporizer we have a machine which safely and very simply produces ideal conditions for forceps delivery and other procedures not requiring relaxation, including caesarean section. Without the patient's knowledge the lever is set at 4–5% while forceps are being boiled. About 7–10 minutes later it is dropped to 1.5%, and the doctor need have no anxieties about the "other end of the patient," provided the midwife can hold the mask accurately. The percentage will of course gradually be dropped still lower.

2. Every patient, irrespective of her constitution, has adequate analgesia. The patients are as enthusiastic as the midwives. The gas-air machine has occasionally had to be given to a patient who has started on trilene when both vaporizers have been required for other cases. Without exception strong disapproval has been registered.

3. During a long labour patients have been encouraged to take nourishment, and vomiting has not resulted.

4. It is necessary to assess the percentage required for each individual, and, subject to this, any midwife trained in gas–air analgesia can use the vaporizer.

5. Maintenance difficulties, the changing of cylinders, and the cartage of cylinders do not arise. If patients knew the low running costs of the method they might scorn it!

COMMENT

It appears that efforts are being made at Oxford to produce a machine which will give a fixed percentage in all circumstances. Is this really what is wanted? Surely an accurate but variable percentage is required, both for the doctor and for the midwife. If a machine with a fixed output is used the relief afforded to many patients will be no better than that afforded by gas–air. We know, for instance, that whereas Mrs. X. gains adequate analgesia and is co-operative on 1.3%, Mrs. Y. becomes uncontrollable on 0.9%, while Mrs. Z., who is desperate in early labour, is provided with 0.3% as an effective placebo. Variability is essential to get the best out of trilene analgesia.

Finally, if I were to concede that there is danger in allowing specially trained midwives to use the vaporizer for analgesia I would argue that this is more than offset by an alternative and graver danger. How many G.P.s have not had to stop in the middle of a forceps delivery to give artificial respiration or deal with vomiting or lack of anaesthesia, when the midwife has taken over the "rag and bottle"? Many of us have found a new pleasure in midwifery with the confidence we have in our midwives' anaesthetic ability. They would never have gained this ability were they permitted to use the vaporizer only occasionally for full general anaesthesia under a doctor's supervision.

We have been lucky here in Guernsey in having such a keen and co-operative nursing staff. Their observations and help have been so encouraging that I felt I must try to bring a report of their 1,400 cases to the notice of those who can spread their enthusiasm.

P. S. A. HEYWORTH, M.R.C.S., L.R.C.P., D.A.

Reviews

RURAL PRACTICE IN THE U.S.A.

Public Health and Medical Care. By F. D. Mott, M.D., and M. I. Roemer, M.D., D.P.H. (Pp. 610; illustrated. $6.50 or 39s.) New York, Toronto, London: McGraw-Hill Book Company, Inc. 1948.

"With broad social perspective it describes the economic and historical developments out of which arise present difficulties in rural medical services . . . it offers recommendations for future action which merit careful study." Thus in a nutshell Surgeon-General Thomas Parran, the writer of the short and pithy foreword to this valuable book, places before the reader the aims and brilliant achievement of the joint authors.

Surely few in Britain know of the economic conditions in rural America which are dispassionately described here, albeit with an occasional vivid touch which might almost have been copied from a page of *Piers Plowman*. "Years of drought and soil erosion spell bankruptcy for farmer and country doctor alike. Too much rain or a sudden wind or an insect pest may wipe out most of a year's income in a matter of days or minutes." The proverbial rude health of the country dweller is questioned in no uncertain terms. Typhoid kills four times as many in rural as in urban districts, malaria nine times and diphtheria three times as many per 100,000 population. In the case of measles, scarlet fever, and whooping-cough the advantage is much in favour of the large towns. Infant mortality is 34.3 for towns of 100,000 and over, 44.6 for small towns, and 43.3 for rural districts. City children are heavier and taller for their age. Actual pellagra and its subclinical manifestations are associated with malnutrition.

The authors are emphatic that there is a large proportion of the rural population which is unable to obtain adequate medical attention, but they show a ready appreciation of the difficulties of the country doctor and the country dentist though forming a just estimate of their deficiencies. They indicate the great gulf fixed between services available to town dwellers and those available to country dwellers—the coloured people faring much worse than any. The outcome of this becomes obvious. The State must take more part in the prevention and treatment of disease. "Circumstances in rural America make national planning and action essential," and the people of the United States are rapidly learning that health security is attainable.

Among the farming class a flat-rate prepayment plan is much favoured for medical, nursing, and hospital services, and there is a feeling that there should be a full application of medical science to meet the need of all individuals in every section of the community. All this points to the establishment of a comprehensive State medical service, of which we have now the beginnings in this country. The authors appear to be fully alive to this, and their own predilection is for a salaried service.

This book is a memorable achievement and one which all interested in public health and social medicine should read. It is easy to read, were it not for the multiplicity of footnotes. Many of these are references and point to the thoroughness of the authors' work, but their place is surely at the end of each chapter; others could be incorporated in the text. The hasty reader may be tempted to ignore them and then find, as does the reader of Gibbon, that some of the most interesting information in the book is being missed. But we say with conviction that this book can be read equally with profit and with pleasure.

WILLIAM N. PICKLES.

IDENTIFICATION OF INSECTS

A Handbook for the Identification of Insects of Medical Importance. By John Smart, M.A., D.Sc. With Chapters on Fleas by Dr. Karl Jordan, F.R.S., and on Arachnids by R. J. Whittick, B.Sc. Second edition. (Pp. 296; 178 figures; 13 plates. 20s.) London: Trustees of the British Museum. 1948.

In his preface to the first edition, which was reviewed in this *Journal* on Jan. 1, 1944 (p. 13), Dr. Smart pointed out that his handbook was particularly intended to assist medical officers serving overseas under wartime conditions, since under these circumstances it is difficult to send specimens to the expert or to obtain the necessary literature for their identification on the

spot. Facilities for interchange of specimens and literature are now better than they were at the time the preface was written: indeed, they are considerably better than before the war. Nevertheless, this call for a second impression, and for a second edition within four years of the first edition, proves the continued need for an authoritative, but not too long, guide to arthropods of medical importance.

The new edition includes some thirty extra pages of text. Dr. Karl Jordan has rewritten and extended by some eleven pages the section on fleas, now named *Suctoria*, and some new illustrations have been added, notably an original illustration of the "jigger flea" to replace the former rather unsatisfactory drawing borrowed from Castellani and Chalmers. The section on tsetse flies has also been added to and considerably altered, chiefly by the inclusion of fresh material on the geographical distribution and vegetative associations of different species. Dr. Kenneth Mellanby has revised and added new matter to the chapter on arachnids. He has now adopted the view, put forward by the reviewer and his colleagues, that all stages of *S. scabiei*, except mature females, may inhabit small temporary tunnels or pockets in the surface of the skin. Additional information on mites includes an account of the part played by *L. bacoti* in the transmission of rodent filariasis, an important infection for chemotherapeutic tests, and of the great advantages of polyvinyl alcohol as a mounting medium. An important addition to the chapter on anophelines is a new table of malaria-carrying mosquitoes, ranked in order of importance, and contributed by Mr. H. S. Leeson. Finally, a very welcome improvement is the much more comprehensive index.

The reviewer has few criticisms to make, but he puts forward the following suggestion in the belief that a third edition will be required in the not too distant future. In view of the admirable economy of space achieved by limiting the number of species regarded as of medical importance, it is surprising to find so much space, both in the text and in the illustrations, devoted to such genera as *Gasterophilus, Hypoderma, Melophagus*, and *Haematopinus*, which, although of great veterinary importance, seldom cause lesions in man. The first edition was sold at the surprisingly low price of 15s., and the new and enlarged edition, which has been produced on superior paper, costs 20s., a small sum to spend on a work so finely produced and of such outstanding merit.

R. M. GORDON.

TEXTBOOK OF MEDICINE

Medicine. Essentials for Practitioners and Students. By G. E. Beaumont, D.M., F.R.C.P., D.P.H. Fifth edition. (Pp. 831: 71 illustrations. £1 10s.) London: J. and A. Churchill. 1948.

This latest edition of Dr. Beaumont's textbook is well printed and well illustrated. I have used it for some time and found no major deficiencies so far as diagnosis is concerned. It gives a well-balanced picture of the world of organic disease. It is obviously designed with both eyes on the final examination in medicine. Recent advances in knowledge, as in jaundice and diseases of the blood, are well presented, but the author still discusses at some length outmoded disturbances of function such as chronic gastritis, hypersecretion, and muco-membranous colic, and says nothing about newer variants such as colon spasm.

It is as tempting to criticize a students' textbook as an anthology, but for a work designed for the student and practitioner the book has two main faults. The first is a tendency to give snippets of information about rarities such as the Stevens–Johnson syndrome or Lutembacher's syndrome. The second is the almost complete suppression of the psychological aspects of disease. How many fellows of the Royal College of Physicians would know what Collett's syndrome is? Yet Dr. Beaumont gives more attention to Collett's syndrome than to psychogenic factors in his account of cardiospasm. Dr. Beaumont probably believes, and I think quite rightly, that much that has been written about psychosomatic medicine is arrant nonsense and not suitable for a students' textbook. But then he should cut out a lot of what I should call the organic nonsense—i.e., the rarities—and the historical nonsense such as Reichmann's disease and pithiatism. The result might be to give us a real Golden Treasury of organic disease, and that is something the clinical student badly needs.

L. J. WITTS.

BOOKS RECEIVED

[*Review is not precluded by notice here of books recently received*]

A Bibliography of Serbian Medical Literature, 1757-1918. By Risto Yeremitch. (Pp. 223. No price.) Belgrade: Serbian Medical Association Library. 1947.

In Serbian.

The Autobiography of Benjamin Rush. Edited by G. W. Corner. (Pp. 399. 32s. 6d.) London: Geoffrey Cumberlege. 1948.

Rush was a celebrated American eighteenth-century physician.

Irregular Discharge. By W. B. Tollen, Ph.D. (Pp. 64. No price.) Washington: Veterans Administration. 1948.

An investigation into why some ex-Service tuberculous patients discharge themselves from hospital against medical advice.

Handbuch der speziellen Pastoralmedizin. Part I. By A. Niedermeyer. (Pp. 508. No price.) Vienna: Herder. 1949.

This volume is on the sex life.

A Catalogue of Insecticides and Fungicides. By D. E. H. Frear, Ph.D. Vol. 2. (Pp. 153. $5.50.) London: William Dawson. 1948.

This volume lists chemical fungicides and plant insecticides.

The Nomenclature of Disease. Drawn up by a Joint Committee appointed by the Royal College of Physicians of London. 7th ed. (Pp. 385. 8s. 6d.) London: H.M.S.O. 1948.

The names are classified by a new system, and a list of eponyms is included.

Clinical Chemistry in Practical Medicine. By C. P. Stewart, M.Sc., Ph.D., and D. M. Dunlop, B.A., M.D., F.R.C.P.Ed., F.R.C.P. 3rd ed. (Pp. 324. 17s. 6d.) Edinburgh: E. and S. Livingstone. 1949.

An account of the more important chemical tests and their uses and limitations; for senior students, house-men, and practitioners.

Psychosocial Medicine. By J. L. Halliday, M.D., D.P.H. (Pp. 278. 17s. 6d.) London: Heinemann. 1948.

A study in psychosomatic medicine and disorders of the social pattern.

Crystals and X-Rays. By Kathleen Lonsdale, D.Sc., F.R.S (Pp. 199. 21s.) London: G. Bell. 1949.

An account of *x*-ray crystallography for the non-specialist who may want to use it.

Factors Regulating Blood Pressure. Edited by B. W. Zweifach and E. Shorr. (Pp. 170. $2.75.) New York: Josiah Macy. 1948.

Papers delivered at a conference on the subject in 1948 at New York.

Blood Clotting and Allied Problems. Edited by J. E. Flynn. (Pp. 179. $3.25.) New York: Josiah Macy. 1948.

The transactions of the first conference on the subject in 1948 at New York.

I Introduce. By Winifred Graham. (Pp. 232. 16s.) London: Skeffington. 1948.

Reminiscences of a well-known authoress.

The Premature Baby. By V. Mary Crosse, O.B.E., M.D., D.P.H., M.M.S.A., D.Obst.R.C.O.G. 2nd ed. (Pp. 167. 12s. 6d.) London: J. and A. Churchill. 1949.

Intended for obstetricians, general practitioners, and nurses.

The Haunting of Toby Jugg. By D. Wheatley. (Pp. 292. 12s. 6d.) London: Hutchinson. 1948.

A thriller.

Sexual Disorders in the Male. By K. Walker, F.R.C.S., and E. B. Strauss, D.M., F.R.C.P. 3rd ed. revised. (Pp. 260. 15s.) London: Hamish Hamilton. 1948.

A practical account intended particularly for the general practitioner.

Housewife Baby Book. By A. Cuthbert. (Pp. 254. 8s. 6d.) London: Hulton Press. 1948.

A guide to mothers on bringing up babies.

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NEONATAL MORTALITY AND MORBIDITY

According to the Report[1] of the Joint Committee of the Royal College of Obstetricians and Gynaecologists and the British Paediatric Association 15,000 babies die unnecessarily each year in England and Wales. This is indeed a challenge, and if the suggested remedy—a more general application of obstetrical and paediatric knowledge by those concerned with treatment, nursing, and administration—would truly suffice, then it is certainly time that steps were taken to implement it. What can be done in other countries was shown in the article by Professor Charles McNeil published in the *Journal* of April 4, 1942. But, disturbing as these figures are, they must be seen in the perspective provided by Dr. W. J. Martin's analysis on another page. Since 1900 there has been a progressive fall in infant mortality, a fall which, however, has been much less pronounced in the first month of life.

The report now issued is an up-to-date miniature textbook on neonatal conditions and as such is worthy of close study by all whose work is connected with obstetrics or paediatrics in their widest sense. It is summarized elsewhere in this issue. Although its main object was to disclose the causes of death and disease in infants during the first month of their lives and the best methods of prevention and treatment, it is clear that a much wider field has been covered and that neonatal health is the concern not only of obstetricians and paediatricians but also of geneticists, economists, and educationists; it is a social problem almost as much as a medical one. This is clearly exemplified by a consideration of the causes of prematurity, which itself is the greatest single factor in neonatal death and was estimated to have been responsible for nearly 17,000 infant deaths in England and Wales in 1945. Maternal diet and health during pregnancy are both directly connected with social and economic factors. The age and parity of the mother, often depending on such matters, have a bearing on the incidence of stillbirths and neonatal death, as does illegitimacy. Clear evidence of the part they play is provided by a consideration of the relative mortality in the Registrar-General's five major social classes: 21.7 in Class 1 and 32.5 in Class 5. Class 5 is a much larger group than Class 1. Diet is equally important, and convincing evidence of the beneficial effects of adequate diet has been obtained in experiments in this country[2] as well as in Canada[3] and Norway.[4] The conclusion is inescapable that improvement in social and economic conditions and a general raising of the standard of nutrition would reduce both the neonatal deaths and the stillbirth rate.

The close relationship between obstetrics and paediatrics becomes more evident when contracted pelvis is considered. This is a common cause of obstetrical difficulty and resultant neonatal morbidity and mortality. The elimination of contracted pelvis in the next generation depends directly on the abolition of rickets in the infants of the present generation; thus the work of paediatricians to-day is of great help to obstetricians of the future. The problem of birth injuries, which cause between one-quarter and one-third of all neonatal deaths, is dealt with fully, and none will gainsay the conclusions that "their prevention demands that the fundamental principles of obstetrics should be applied by all doctors and midwives, and that all concerned should constantly bear in mind the welfare of the infant as well as that of the mother." Consideration of the effects of anaesthetics and analgesics administered to the mother during labour comes at an opportune moment in view of the present discussions in Parliament and the recent report of the Medical Women's Federation published in this *Journal*. The possible ill effects—asphyxia, prolongation of labour, and cerebral injury—are discussed, and the conclusion reached is that the ideal method of anaesthesia or analgesia has yet to be discovered. As Sage[5] expresses it "The ultimate evaluation of any method of analgesia will depend on the price paid for the mother's comfort in terms of infant mortality." The appointment of full-time resident anaesthetists with obstetrical experience on the staff of maternity hospitals is recommended.

Much work has been done in recent years to improve the prognosis for premature babies. While, as the report stresses, the primary attack should be obstetrical, aimed at prolonging the period of gestation to the latest possible day, there is still much more that could be done to care for these infants after birth. "It is incumbent upon every district to plan and administer a suitable scheme for the care of premature babies." How far have we progressed towards this end? How many centres have established "premature units," and in how many have arrangements been made to accommodate mothers as well? Although Gordon[6] has brought forward evidence that breast milk may not be the ideal food for very small premature babies (who need extra protein and mineral salts and a minimal amount of fat), no one will deny the supremacy of breast milk when the infant is big enough and strong enough to take a breast feed without exhaustion, which may be when he is from 4 to 4½ lb. in weight. Therefore all possible steps should be taken to provide breast milk for him from this time onwards. In any discussion on the care of premature babies, whether they should be nursed at home or in special units in children's or maternity hospitals, the basic factor is, however, always that of nursing care. Without adequate nursing they will die, either at home or in

[1] *Neonatal Mortality and Morbidity*. Reports on Public Health and Medical Subjects. No. 94. H.M.S.O. 1949.
[2] Balfour, M. I., *Lancet*, 1944, **1**, 208.
[3] Ebbs, J., Brown, A., Tisdall, F. F., Moyle, W. J., and Bell, M., *Canad. med. Ass. J.*, 1942, **46**, 6.
[4] Toverud, K. V., *Acta paediatr.*, 1939, **24**, 116.
[5] *J. Amer. med. Ass.*, 1944, **124**, 339.
[6] *Amer. J. Dis. Child.*, 1947, **73**, 442.
[7] *Edinb. med. J.*, 1943, **50**, 332.

hospital. In no phase of the present shortage of nurses is the position more acute than in this.

Diseases of the newborn are dealt with comprehensively in the report, and a full bibliography adds materially to the value of this section. Special recommendations are given for the prevention of infection, and when it is realized how high a toll infections take in the newborn period, especially in institutions (Macgregor[7] found infection in 73.6% of 140 necropsies on infants dying between 8 and 28 days after birth), the importance of studying and applying these recommendations is self-evident.

Which is better, hospital or domiciliary midwifery, is still controversial; the pros and cons of each are clearly defined in the report, and methods for the improvement of both are given in detail. The recommendations dealing with delivery in the home could be implemented readily; those for hospitals would in many cases call for more alterations and reconstruction than can be anticipated for some years yet, important as they are. Domiciliary midwifery calls for first-class antenatal supervision, with careful selection of cases suitable for delivery at home, and should be conducted in close liaison with a maternity hospital and its obstetric and paediatric staff, who should be available for domiciliary visits when necessary. Institutional midwifery offers many advantages to the mother but, at present, increased risks to the infant, particularly from infection. Most maternity hospitals and departments would require considerable increase in nursing staff as well as architectural alteration in their nursery accommodation or perhaps, preferably, accommodation for mother and infant together) if the recommendations were adopted fully. Methods of improving antenatal clinics are outlined, and stress is laid on the value, in research and in the training of doctors and nurses, of infant-welfare clinics attached to maternity hospitals and staffed by paediatricians. In most medical schools in this country the teaching of neonatal health and disease has been the part of the clinical curriculum most in need of improvement—the part of his course in which the average student receives less instruction than in any other subject, yet it is one with which he will constantly be called to deal in practice. Remedying this defect would be of great value to the community. Compulsory notification of premature births and the performance of routine post-mortem examinations in all neonatal deaths are two of the Committee's recommendations with which few will disagree.

No less important are the wider views expressed in the concluding chapter. Social and economic considerations are as relevant as the specific obstetric and paediatric ones. Unless every family has an income sufficient to provide all its members with an adequate diet, unless the feeding is well planned, housing accommodation improved, and all cities provided with open spaces, true child health cannot and will not be achieved. Education of the people in all sections of the community to make full use of the facilities available is also required. Child health, in its fullest sense, must of necessity be closely bound up with a high moral and spiritual standard of family life. This truth cannot be stressed too much; it is so often overlooked. The increase in juvenile delinquency in recent years is related in no small measure to a lowering of these standards.

HYPERTENSION IN UNILATERAL RENAL DISEASE

Goldblatt demonstrated that partial constriction of one renal artery may lead to systemic hypertension in the experimental animal. This led to the search for a comparable condition in man, and many such cases have now been reported. Some were recognized only at necropsy, some in the course of routine investigation of urological symptoms, and some as the result of full investigation of cases presenting with apparent essential hypertension. From the experience thus gained it is now possible to assess the frequency in man of the syndrome of hypertension due to unilateral renal disease and to make some estimate of the prospects of alleviating the hypertension by removal of the diseased kidney.

Several reviews of the present position have recently been published. The frequency of the syndrome may be judged from the experience of Ann Arbor Hospital, Michigan, where 2,055 consecutive cases of "essential" hypertension were submitted to pyelography.[1] In this series pyelonephritic lesions were revealed in 183 cases, a frequency of 8.9%. In 113 such cases (5%) the lesion was unilateral, but only about one-third of these were suitable for operation—about 1.5% of the original series. Braasch, Walters, and Hammer[2] approached the problem from another angle and found pre-operative hypertension in only 18.4% of a series of 1,684 patients subjected to renal surgery of all types, whereas hypertension was found in 20% of a series of 975 consecutive control cases. Clearly hypertension due to unilateral renal disease is relatively rare. It is scarcely practicable to submit all cases of hypertension to routine pyelography, and some selection will be needed. Langley and Platt[3] suggest that an intravenous pyelogram should be done in all persons under 45 presenting with hypertension, in all who give no family history of hypertension, and in all who have a history of "bladder trouble," cystitis, frequency, dysuria, haematuria, or renal pain. When a lesion of one kidney is found in a case of hypertension the question of nephrectomy must be considered. As Dossot[4] points out, nephrectomy is sometimes indicated on surgical grounds alone. In other cases the surgical indication is for conservative interference, but the presence of hypertension sways the decision in favour of nephrectomy. In the remainder there is no such surgical indication, and the decision must be taken in terms of the likely effect on the hypertension itself.

The careful analysis by Langley and Platt[3] of the results of over 100 recorded cases of nephrectomy for this syndrome reveals many of the points on which the decision may be based. The renal lesion should be strictly unilateral, and compensatory hypertrophy should have occurred in the healthy kidney so that total renal function is still unimpaired. There should be no significant family history of hypertension, at least in the older subjects, and no history of pregnancy toxaemia. A long duration of hypertension is not necessarily a contraindication, for

[1] Ratliff, R. K., Nesbit, R. M., Plumb, R. T., and Bohne, W., *J. Amer. med. Ass.*, 1947, **133**, 296.
[2] Ibid., 1940, **115**, 1837.
[3] *Quart. J. Med.*, 1947, n.s. **16**, 143.
[4] *La Semaine des Hôpitaux de Paris*, 1948, **24**, 1155.
[5] *J. Urol.*, 1948, **59**, 8.
[6] *Factors Regulating Blood Pressure*. 2nd Conference. 1948. Josiah Macy, Jr., Foundation. New York.

hypertension lasting up to 10 years has been improved by nephrectomy. Retinal haemorrhages and papilloedema are not contraindications to operation and do not necessarily exclude a successful result. Indeed, the very urgency of these eye signs makes an attempt at alleviation in suitable cases highly desirable, though relatively few such cases have been reported. Recently Sabin[5] recorded one case in which two dioptres of papilloedema and flame-shaped macular haemorrhages disappeared after operation. Elsewhere in this issue of the *Journal* Maitland reports another case in which unilateral nephrectomy led to the disappearance of papilloedema and the maintenance of a normal blood pressure for over 12 months, in spite of a full and active life being led.

The most favourable renal lesion is a unilateral pyelonephritis, and where this is responsible for the hypertension the prospect of success, judging by published reports, is nearly 50%. Calculi and hydronephroses are not so favourable, but taking all types of unilateral lesions it seems that in 40% of the cases the blood pressure will remain normal for at least a year after operation. It might be assumed that the natural temptation to publish successful rather than unsuccessful results may make such figures unduly optimistic, but the reports from the Ann Arbor Hospital[1] suggest that these estimates are reliable. This hospital had 26 (53%) failures in a series of 49 cases operated on, and 17 cases (35%) in which the blood pressure returned to normal; improvement occurred in the other six cases.

It is fair to say that despite intensive experimental study there is no entirely satisfactory explanation of the failure of unilateral nephrectomy to reduce hypertension in all cases, and the mechanism by which the hypertension is produced is not yet clear. Originally Goldblatt claimed that removal of the ischaemic kidney during the hypertension following constriction of one renal artery was followed by prompt return of the blood pressure to normal. Subsequent experimental work on animals has shown that this fall by no means always occurs, which is in line with clinical experience. Grollman, who discussed this problem at a recent conference[6] on factors regulating blood pressure, considers that the rapid rise in blood pressure following the application of a tight clamp to the renal artery must be distinguished from the much slower rise produced by applying a figure-of-eight ligature to the kidney. In the latter experiment removal of the constricted kidney does not in his experience lead to a fall in blood pressure, and Grollman is doubtful whether a fall often occurs even in the first type. The suggestion made by Byrom and Wilson that constriction of the renal artery by raising blood pressure causes an arteriolar lesion of the intact kidney, which leads to a perpetuation of the hypertension when the constricted kidney is removed, is the best explanation so far put forward, but it is not yet universally accepted.

There are other phenomena which cannot readily be explained along such lines. Thus if two rats are joined in parabiotic union with a common circulation and both kidneys of one rat are removed, those of the other remaining intact, then the nephrectomized rat becomes hypertensive while the rat with intact kidneys maintains a normal blood pressure. From this it would appear that the pr sence of damaged or ischaemic renal tissue is not essenti to the development of hypertension, and there is oth experimental evidence supporting the view that hyperte sion can be maintained in the absence of the kidne Much of the confusion in the experimental lite ture may be due to the varying behaviour of differe laboratory animals. The rat appears to be particula liable to develop hypertension under experimental con tions. Its response to clamping of the renal artery is w well known, but it also develops hypertension after exp sure to repeated loud noises, and in the opening pages this issue Hartroft and Best report that a severe hyp tension can be produced in rats which are given a di deficient in choline for a short time in early life. Th hypertension in this case is associated with a haemorrhag renal lesion, but attempts to produce a similar lesion i other species have so far been unsuccessful. As Hartro and Best point out, it cannot yet be claimed that th choline-deficiency hypertension has clinical significanc Nor is it certain that other experimental results obtaine in the rat are applicable to the human subject. The fa remains that hypertension due to unilateral renal disea though uncommon, can be relieved in a proportion of ca by nephrectomy. The existence of this syndrome shou therefore be borne in mind, so that cases capable of rel or cure will not be overlooked.

SEXUAL OFFENDERS

For many years legal, administrative, and medical author ties, as well as other interested persons, have felt di satisfied with the treatment of sexual offenders whose illeg behaviour is attributable to minor mental abnormality or t personal deviations of character which exclude them fro the provisions of the Lunacy or Mental Deficiency Act The sexual offender group is a large and important on but its position in relation to acquisitive and aggressiv offences varies with the age of the offenders. The figure for the ten-year period 1929 to 1938 show that when person of both sexes convicted at Assizes and Quarter Session together with those convicted of indictable offences i Courts of Summary Jurisdiction, are considered in ag and offence groups, sexual offences are second in fr quency under the age 21 years and at the age of 50 an over. Between the ages 21 and 50 sexual offences occup the third place. These relations are important in any wid approach to the subject, since minor mental abnormaliti and habit formations can be most successfully dealt wi in young people and less successfully in older offenden

The Report on "The Criminal Law and Sexu Offenders," prepared by the Joint Committee of th British Medical Association and the Magistrates' Asso ciation and published in this week's *Supplement*, is a indication of anxiety about the present situation. Its con structive suggestions deserve the earnest consideration o those who are immediately concerned with this comple socio-medico-legal problem. The Report appears to acce the fact that normality is consistent with the commission o a sexual crime. Indeed, it would be difficult to conside otherwise, as it is generally recognized that the strength wil

which an instinctual urge operates varies widely in normal men and women. It may be thought that the Committee, without detracting from the force of its main argument, might have mentioned that the turpitude of sexual as well as other varieties of crime is often assessed by disputants whose experience is limited, and who fail to recognize that an apparently unusual crime is not necessarily evidence of mental disease or mental defectiveness because it differs from their own pattern of behaviour. The Committee recognizes that different medical opinions are held concerning the classification of the mental and physical conditions which may be related to sexual offences. At the same time it is accepted that there may be groups other than those mentioned which are not so generally acknowledged. The classification referred to by the Committee will satisfy the practical experience of many observers, and the conclusion will not be disputed that in order to protect the public and to make the wisest decision a court should know to which, if any, of these groups the offender belongs.

Among other justifications for dealing specially with sexual offenders from a remedial point of view the Committee suggests that the effect of a sexual assault upon the victim may not be apparent immediately, or even for some years, so that the enormity of the offence may not be fully assessed at the time of the trial. Different observers may dispute whether this is a frequent sequel. Some have been impressed with the insignificance with which a young child, untutored in the meaning of sex, may regard an indecent assault. They are also impressed by the fact that the tendency to return to normality unaided is not unusual. However this may be, we cannot disregard the fact that if a man has been killed by another, with or without intent, the effect may be disastrous to his dependants; and long-term suffering may be inflicted upon the victim and his relatives who have been deceived by a fraudulent company promoter. The remote effects of crime are not confined to the victims of sexual offenders. The Committee suggests that the best way in which knowledge can be obtained and the widest use be made of it is by adequate medical examination after guilt is proved and before sentence is passed. It may be assumed that the Committee was not here considering the issue of criminal responsibility, which necessarily requires a detailed medical examination before trial. But it should be clearly understood that the mental attitude of the offender towards his offence, as well as towards the examining physician, is not necessarily the same before and after trial. The former may be more revealing than the latter.

The discussion on private and female homosexuality, the codification of sexual offences, and other considerations—such as the setting up of an expert inquiry in which legal and psychiatric experts could take part and discuss whether those suspected of sexual offences should be permitted when approached by the police to make an uninterrupted explanation if they wish to do so—are highly controversial subjects. And many may think that any legal alterations which allow the actual or potential offender to think that law and order are weakening in his favour is inappropriate at a time when crime in general is becoming a grave menace to social security. The Committee believes that when the special institution envisaged by Norwood East and Hubert is provided for the treatment of psychiatric patients who have committed crimes, courts should have some power to pass a longer sentence than now in cases of exhibitionism provided that such extended terms could be served in the institution. At the same time the Committee regards any extension of the term of ordinary imprisonment as undesirable. Norwood East has advocated the use of more extended awards, not however exceeding present sanctions, in cases which appear suitable for treatment in the special institution. He considers that this will often be more advantageous for the offender than a shorter and ineffective sentence with its consequential risk of subsequent sentences of imprisonment for later offences.

In viewing the Report as a whole caution is necessary lest the problem of the psychiatric treatment of crime is considered in terms of sexual offenders only. It is of course generally recognized that it is the offender and not his offence which requires treatment. But some persons appear inclined to believe on insufficient grounds that sexual offenders are particularly suitable for medical treatment. It would be calamitous if studies on sexual crime and sexual offenders diverted attention from the general problem of the medical treatment of the group described by East as the non-sane non-insane offenders. The Committee has been concerned with only one part of the problem, but even here we do not know its size, and no estimate is given of the probable proportion of psychiatric successes and failures which may be expected. These are important matters when fresh legislation is invoked. It may be hoped that the Report of the Committee will promote further studies in this important field. It is a valuable and provocative contribution to the problem of the treatment of sexual offenders, and many will agree with several of its findings.

REMUNERATION IN GENERAL PRACTICE

The Report on Remuneration of General Practitioners prepared by the General Medical Services Committee and published in the *Supplement* of Feb. 19 was the principal matter for discussion by the Special Conference of Representatives of Local Medical Committees on March 3 under the chairmanship of Dr. W. Jope. The outcome of a debate which lasted a whole day was the acceptance of the Report as it was presented—a tribute to the care with which the Report was drafted. The Report, it may be recalled, was in two parts. The first was concerned with the inadequacy of the central fund for the remuneration of general practitioners, and the second with the distribution of the increase to the fund which it is hoped to obtain from the Government.

The General Medical Services Committee based its recommendations on the Spens Report, accepted both by the medical profession and by the Government. Before the war general practitioners' gross income from all sources was £28.14 million. It was agreed between the B.M.A. and the Government that this was less than it should have been to the extent of £3.1 million. Taking £31.24 million as an adequate total income of general practitioners before the war, the Ministry of Health for the purpose of remuneration of general practitioners in the

National Health Service added a gross betterment factor of 34%, made up of 55% applied to practice expenses and 20% to net income. The 20% was decided on in 1946 at a time when the official figure for the increase in the cost of living for the middle and professional classes was 45%, and was not accepted by the medical profession. According to expert calculation the increase in the cost of living since 1946 has risen from 45% to 85%. The case for a higher betterment factor is therefore clear and strong. If the medical profession had accepted the Ministry's 20% betterment for net remuneration in 1946 when the increase in the cost of living was 45%, then with the present increase in the cost of living of 85% the betterment factor should be 60%. The General Medical Services Committee and the Conference of last week stressed the fact that the profession had not accepted the Ministry's figure of 20% in 1946, and tried to arrive at a figure which would be fair and reasonable. Some, justifiably nettled by the arbitrary fixing of the betterment factor three years ago, were inclined to demand a betterment factor of 85%, to tie it in fact to the present cost of living index of the professional and middle classes. This, however, as one speaker pointed out at the Conference last week, would be to claim for the medical profession a special exemption from the consequences of the country's present economic position. The Conference accepted the Committee's view that practice expenses have probably gone up during the past two years and its recommendation that the betterment factor of 34% for gross remuneration should be increased to 70%. This, with the allowance for the greater number of principals now in the Service, would increase the central fund by about £16½ million.

It is important to realize that this proposal is in line with the recommendations of the Spens Report, according to which the betterment factor should be related to changes in the value of money and to increases in the incomes of other professions. There was an understandable anxiety lest conditions in general practice should in relation to other work become so unattractive as not to encourage young men and women to enter this important branch of medicine. That this anxiety is real is evidenced by the large numbers of recently qualified practitioners who are now seeking higher qualifications in order to practise one of the numerous specialties characteristic of medicine to-day. The Ministry of Health's proposals for the remuneration of specialists and consultants based on the second Spens Report should be published soon, and young doctors contemplating entering general practice will no doubt eye these proposals with as much interest as those already working as consultants and specialists.

A year or two ago it is probable that the Panel Conference, as it was then called, would have argued that any increase in the central fund should be used to raise the standard capitation fee independently of the size of an insurance practitioner's list. But with the virtual disappearance of private practice and the institution of a health service available to the whole population the situation is changed. As our correspondence columns have shown, and as has been admitted by prominent Labour Party spokesmen in the House of Commons, many general practitioners are suffering severe financial hardship. Those who have suffered much are men and women practising in rural areas, a their case was partly met by the addition of £700,000 the Mileage Fund. But not all rural practitioners wou agree that this is the complete solution of their econon problems. Four-fifths of the area of England is still rur and conditions vary widely. Men practising in resident areas whose private practice has disappeared have suffer perhaps as much as rural practitioners. Things being they are, these doctors cannot build up large lists ever it were thought desirable that they should. As the Rep of the General Medical Services Committee points out is those with average or less than average lists who ha felt the pinch. With the whole population now able t take advantage of the National Health Service more fr more people are demanding its benefits, and general pra titioners are overburdened with the increase of wor With such considerations as these in mind the Gener Medical Services Committee put forward a recommenda tion accepted by the Conference that any increase in mon obtained as a result of the present negotiations should b devoted to raising the capitation fee for the first 1,00 patients on the lists of all practitioners. If this propos is accepted by the Special Representative Meeting and b the Government, and granted that an adequate betterme factor is secured, then the undoubted financial distre experienced by men and women practising in rural a residential areas will be relieved and all will benefit. A the same time there will be less economic pressure on practitioner to accumulate a large list in order to secure reasonable reward for his services.

IS INFLUENZA EPIDEMIC?

Are we getting an influenza epidemic this year, or not There seems to have been an unusually extensive one o the Continent. Has it arrived here, and, if not, why not So far as we can learn, an extensive outbreak began i Sardinia in October of last year. Soon after, it spread t the mainland of Italy and became extensive by Decembe nearly all over that country. It was already causing troubl in Southern France by November, and by the end o December had reached epidemic proportions in the Lyo and Paris areas. By January influenza was already prev lent in Austria and had apparently spread from Franc through Belgium to Southern Holland. Now there ar cases in Germany, and there are scattered localized ou breaks in England and Scotland. Virus was recovered London on Jan. 6 from two people who fell ill short after arriving from Paris, and there are other reports infection being introduced from the Continent. In Fran the attack rate has been very high; reports of exact inc dence vary and are probably mostly based on guesswor Why has not influenza swept over England as ov France? Until a few weeks ago the reported deat from influenza in the 126 great towns were in the forti which is low for this time of year. In successive week they have now gone up to 64, 94, 158, and 251 in the wee ended Feb. 26. But this is still not as high nor rising steeply as would be likely before a real epidemic.

What do virus-workers have to say about all this? Sin our last experience of influenza the World Health Orga zation has set up at the National Institute for Medica Research a World Influenza Centre; the function of th is to collect information, but more especially to collec study, and distribute strains of virus from all over th

world. The Centre is now in action for the first time. It has been receiving viruses from Italy, Switzerland, France, Holland, Czechoslovakia, and from this country. These have been compared by the haemagglutination and complement-fixation tests with each other and with strains from previous outbreaks, and the results are interesting. The Czechoslovakian strain is an influenza B; all the others are A and of sub-strains identical with each other. They are not at all closely related to the PR8 and other classical A strains studied in laboratories up to 1947; but they stand very close to the type of A virus most widely prevalent both in the U.S.A. and in parts of Europe in 1947. Most remarkable of all, a virus from an outbreak in October, 1948, on Ocean Island in mid-Pacific proves to be of the same "new" kind. The 1947 strain is sufficiently different from previously studied variants of A for vaccines made from earlier types to be unavailing against it. It behaves oddly in several ways, so that the unwary may be tempted to believe that it is not an A virus at all.

This A variant was prevalent (though not very troublesome) over here in 1947. Can we ascribe our freedom from a bad influenza outbreak to an immunity "hang-over" from our 1947 experience? Sweden had this virus in 1947: Sweden has (as yet) reported no A epidemic this year, only minor B outbreaks. France and Italy, which are not known to have met the 1947 type of A virus before, have just had extensive epidemics. Do we begin to see daylight? Unfortunately for our theories Holland encountered this type of virus in 1947 and has nevertheless experienced a lot of influenza this year. The first cases were reported at Eindhoven on Dec. 30, 1948, and the disease appeared in Leiden seven days later, the incidence generally being estimated at 5–10%. It seems to be emerging, nevertheless, that this kind of study of influenza on an international basis is likely to yield dividends of knowledge concerning the epidemiology of the disease, to aid us in forecasting what may happen, and to help us to be prepared with an appropriate vaccine.

HYPERTENSINASE

Modern research into the nature of hypertension began with the discovery by Goldblatt that a permanent increase in blood pressure can be produced by partial constriction of the renal arteries. It was later shown that renin was secreted by the ischaemic kidney and that this substance, itself inert, interacted *in vitro* with a plasma globulin to form the vasoconstrictor hypertensin. The latter disappears rapidly from incubated renin and globulin substrate, and its action is extremely transient. Leloir and his colleagues[1] showed that if pure preparations of renin are used hypertensin remains. This ephemeral existence of hypertensin was attributed to the lytic action of an enzyme named hypertensinase, which has been extracted from various animal tissues; intestinal mucosa and kidney are the richest sources. Almost all the hypertensinase present in the blood is in the red cells; haemolysis considerably increases the amount in the plasma. Substances with hypertensinase activity are widely distributed, and curiously enough many plants contain more than do animal tissues. Gollan, Richardson, and Goldblatt[2] investigated plant sources and found that the bran portion of wheat contained hypertensinase which, after an elaborate extraction, was relatively non-toxic. Intravenous injection into dogs increased the amount of enzyme in the plasma, and this was effective in preventing the usual rise of arterial tension caused by injections of renin and hypertensin. Experimental renal hypertension is reduced by intravenous administration of the plant enzyme, this effect lasting as long as the plasma level is raised. In 1942 Bean[3] made the important observation that the activity of hypertensinase was reduced to *nil* at 0° C.; this was of use to Gollan, Richardson, and Goldblatt,[4] who were searching for pressor substances in dogs with experimental hypertension. By rapidly cooling blood samples they were able to reduce hypertensinase activity and as a result to demonstrate a circulating pressor substance in experimental benign hypertension. In malignant hypertension this substance was present in much greater quantities, and it has the same properties as hypertensin produced *in vitro*. The authors have therefore suggested that this name should be used. These studies have been made only during the early phases of experimental hypertension, and conclusions drawn from them are remote from the problem of human hypertension. However, their importance must not be minimized. The facts acquired about renal hypertension produced experimentally in animals all go to confirm Volhard's insistence on humoral mechanisms being responsible for the disease in man.

[1] *Rev. Soc. argent. Biol.*, 1940, **16**, 75.
[2] *J. exp. Med.*, 1948, **87**, 29.
[3] *Amer. J. Physiol.*, 1942, **136**, 731.
[4] *J. exp. Med.*, 1948, **88**, 389.

BONES AND THE ENGINEER

"Bone," it has lately been stated, "may be considered as an elastic brittle material, having about one-fourth the compressive strength of cast iron and more than twice that of hickory wood." The latter comparison suggests the country of origin of the quotation: it is taken from a preliminary report on tests on the properties of bone, treated as an engineering material, which have been carried out by the United States Bureau of Standards as part of an investigation by the U.S. Naval Research Institute.[1] The research originated from the wartime experience that when man and machine are together involved in an accident there is often a surprising lack of certainty about which will suffer most. It was felt desirable, therefore, to measure with greater precision than before the physical properties of bone. One of the results has been to confirm, with gauges which could detect a movement of only two parts in a million, that virtually up to the moment of fracture bone remains an almost perfectly elastic material. Its compression or deformation, in other words, is closely proportional under all conditions to the force which produces that deformation. This, it is pointed out, will enable the figures which have been obtained for the different elastic constants and breaking strains of bone to be more readily applied in calculation. They are to be confirmed also in a further series of measurements, not yet reported, on complete knee-joints. An additional conclusion, which may have practical interest, is that there is good correlation between the density of healthy bone and the extent of force per unit area which it will withstand. It is hoped to extend this observation to a comparison between strength and radiographic appearance.

The reader may suppose from this that it is the intention to eliminate from training as paratroopers those who may be more than usually prone to break their legs or ankles on landing. Paratrooping is probably not the only occupation in which fracture is a special risk, and if the suggested correlation is established the incidence of some accidents might conceivably be reduced by using a method of personnel selection based on the knowledge thus obtained. Measurements of the strength of bone have been made before, but measurements of engineering precision are apparently a new development. A useful piece of knowledge already acquired is that bone will stand about as much compression crosswise as along its length.

[1] *Mechanical Engineering*, 1948, **70**, 827.

NEONATAL MORTALITY AND MORBIDITY

CONCLUSIONS OF EXPERT COMMITTEE

Seven years ago the British Paediatric Association began a study of neonatal mortality. It was soon realized that the study would be more profitable if it was undertaken in collaboration with the Royal College of Obstetricians and Gynaecologists. A joint committee of 18 was formed, with Sir Eardley Holland, of the Royal College, as chairman, and Sir Leonard Parsons, of the B.P.A., as deputy, and a report, approved by the executives of both organizations, has been drafted by Prof. T. N. A. Jeffcoate and Prof. Norman Capon and forms another of the series of Ministry of Health reports on public health and medical subjects.[1] It is an excellently documented piece of work; a bibliography extends to hundreds of references to the literature of the subject, principally of the last five years.

Of the deaths of infants in 1945 more than half (24.8 out of 47 per thousand live births) occurred during the first month. These figures may be compared with those for the five-year period 1906–10, when the infant death-rate was 117 and the neonatal death-rate 40, showing that the improvement since then has been much less significant during the neonatal period than during the succeeding eleven months.

The rate of neonatal mortality differs markedly in different parts of the country. Greater London and south-east England have rates which compare with the relatively low rates achieved in the Netherlands and New Zealand, but in many large industrial towns the mortalities remain distressingly high. Economic and social factors play an important part. Thus in one short series of years the neonatal death-rate was half as high again in the class of unskilled workers as in the professional class. Even in the groups in which maternal age and parity are most favourable, such social influences as bad housing, malnutrition, ignorance, high fertility together with insufficient help in the home, and lack of preparation for marriage make for high foetal death-rates. On the other hand, in well-to-do families, despite the disadvantage of the relatively greater number of primigravidae and the generally higher age of maternity, it has been shown to be possible, by first-class medical and nursing care, to attain low stillbirth and neonatal death-rates, as witness the surveys of Allen and others in 1943 and of Baird in 1945. It is considered, therefore, that the more general application of present-day knowledge of obstetrics and paediatrics by the medical and nursing professions and those responsible for social services and hospital administration would result in considerable improvement.

"The evidence goes to show that the present neonatal mortality and stillbirth rates could be reduced by one-third to one-half, and, if they were, there would be a saving of about 15,000 babies each year in England and Wales alone."

Maternal Health

The stillbirth rate is relatively high in the first pregnancy, at its lowest in the second, and then slowly rises until, in the fifth, it is as high as in the first. The same is true of neonatal mortality except that the variations are not so marked.

"The ideal family from the standpoint of low foetal mortality would be four or five children, with the mother not more than 24 when she has her first child, and not more than 35 when she has her last."

A lengthy section of the report is devoted to diet in pregnancy. Pregnancy is described as a "diet efficiency test" during which borderline states of malnutrition may be revealed which would otherwise have remained latent; but it is pointed out that the special care of the woman's health and nutrition should not be deferred until she becomes pregnant—it should be continuous.

Among the diseases of pregnancy special attention is drawn to toxaemia. The death-rate among infants born of toxaemic mothers is two to four times as high as the total death-rate. From an analysis of hospital records it is computed that nearly 20% of babies dying in the neonatal period were born of mothers suffering from toxaemia. The babies so born are exposed to the risks of prematurity and are specially liable to intracranial haemorrhage. The underlying cause of the toxaemia is not known, and the treatment is generally empirical. Nevertheless, there is evidence to show that a proper diet and healthy living conditions will lessen its incidence.

On the question, again to the fore, of the use of anaesthetics and analgesics in labour, the report takes a judicial view. It is pointed out that a large and increasing number of obstetricians regard the use of these agents as desirable, not only on humanitarian grounds, but also with a view to preventing post-confinement neuroses and psychoses. There is good reason to believe that analgesics and hypnotics properly employed may facilitate the progress of natural labour by relieving pain and allaying anxiety, and may thus afford a high degree of protection for the child. On the other hand, they often prolong the duration of labour and may increase the need for operative delivery, with consequent danger of birth injury and intranatal asphyxia.

"Although some forms of analgesia such as nitrous oxide and air, with the percentage of each controlled by a special machine, have been shown to be so safe that they can be used by suitably trained midwives, the administration of anaesthetics in midwifery is a special subject demanding the services of an expert if it is to be done with safety for both mother and child. In our opinion the appointment of full-time resident anaesthetists with obstetrical experience should be considered by all maternity hospitals."

The ideal method for the use of anaesthetics and analgesics in midwifery has still to be discovered.

Congenital Malformations: Birth Injuries: Prematurity

Congenital malformations, according to the Registrar General's figures for two recent years, account for four neonatal deaths in every thousand live births. These figures must be accepted with caution, because it is likely that many of the cases were not verified post mortem. Little is known about the mechanism of the production of malformations, so that there seems little hope of reducing the incidence except by eugenic methods.

Probably 60 to 70% of neonatal deaths are due to conditions related in one way or another to birth. Birth injury is one of the leading causes of death in the first month, and the majority of such deaths occur in the first week. It is the immediate cause in approximately one-fourth to one-third of neonatal mortalities. The causation is in general mechanical. Two important predisposing causes are prematurity and anoxaemia (asphyxia). The latter condition, to which a short section is devoted under the heading of "Care of the Newborn," is considered to play a part—often a leading part—in about 50% of neonatal deaths.

The premature or immature foetus has the advantage of easier delivery due to its small size, but this does not compensate for the increased vulnerability of its tissues. During the first week the commonest causes of death among prematures are birth injury, usually intracranial, and asphyxia. Afterwards the neonatal mortality is more often due to infection. The cause of the prematurity can be demonstrated only in about half the cases. Toxaemia of pregnancy, antepartum haemorrhage, multiple pregnancy, and foetal malformation may all be concerned in the causation. About half the neonatal deaths are said to be due to prematurity from one cause or another, and the added handicap of possible morbidity in the survivors should not be forgotten. Physically many premature children attain average height by the age of 3. On mental development various opinions are held, some claiming that there is a significant incidence of mental abnormality among these children.

The diseases to which immature infants are specially liable are cerebral damage or abnormality, anaemia, and infection of the respiratory tract, while difficulties of digestion and absorption of milk make for an increased tendency to malnutrition and rickets. Such feeding experiments as have been carried out indicate that the incidence of prematurity can be lowered by suitable diet. Apart from this, and improvements in standards of general health during pregnancy, the chief hope lies in reducing the incidence of toxaemia and ante-partum haemorrhage. Recommendations are made for the treatment of premature babies. The first is that the child should be in

[1] *Neonatal Mortality and Morbidity*. Ministry of Health Reports on Public Health and Medical Subjects. No. 94. Report by a Joint Committee of the Royal College of Obstetricians and Gynaecologists and the British Paediatric Association. London: H.M. Stationery Office. 1949. 1s. 6d. net.

the care of specially trained nurses working under the supervision of a paediatrician who has had experience of the newly born. Medical treatment takes a secondary place in comparison with feeding and general nursing care, but it is mentioned that many claim that thyroid extract is helpful during the early weeks, and nikethamide may be used in addition to oxygen when there is a threat of vasomotor and respiratory collapse. A breast-milk bank is advocated to supplement the milk available from other mothers in hospital and to provide when necessary for the feeding of premature babies who have to be nursed in their own homes.

Care of the Newborn

In addition to the special considerations attending the care of the premature infant, the report gives detailed recommendations for the medical and nursing care of the newborn, stressing the need for an adequate supply of human milk, gentleness in handling, supervision of respiration and temperature, and protection from infection. It is pointed out that breast-feeding is cleaner, cheaper, and, when lactation is satisfactorily established, easier than artificial feeding, and that the general progress of breast-fed infants is more satisfactory. Not every mother is able to breast-feed her baby, but probably 80 to 85% of mothers should be able to manage it, and many fail to do so when they could. Neither vitamin C nor vitamin D is adequate in human breast milk to secure protection against scurvy and rickets respectively, and these vitamins should be added to the diet of the breast-fed as well as the artificially fed infant.

The report then passes in review the various diseases to which the newborn baby is liable, with special reference to haemolytic disease. The report of Cappell (*British Medical Journal*, 1946, 2, 601, 641) is cited as illustrating to what complexity the Rh factor, operating as a Mendelian dominant, gives rise. About 17% of the population (apparently the figure is lower among Jews) are Rh-negative, and in one in eight marriages the wife may be expected to be Rh-negative and the husband Rh-positive, so that she may come to carry within her uterus an Rh-positive foetus, with the possibility that the antigen in the foetal red blood cells may stimulate the formation of specific antibodies in the mother's blood which may cause haemolysis of the infant's erythrocytes and destruction of other cells. The frequency of haemolytic disease, however, is not nearly as high as these figures suggest. In the large majority of cases either there is no break in the placental barrier against the antibodies or the woman does not react to the antigens by antibody formation. The treatment of haemolytic disease in the newborn is as yet far from satisfactory, though much can be done by prompt and possibly repeated transfusions with Rh-negative blood, a supply of which should always be available in obstetric units.

Institutional versus Domiciliary Midwifery

A discussion on the infections of the newborn, which constitute one of the major problems of neonatal health and hygiene, opens up the old argument of domiciliary as opposed to institutional midwifery. It is admitted that infections are more liable to occur in hospital than in domiciliary practice, the chief reasons being cross-infection, the unsatisfactory general standard of knowledge in the medical and nursing professions—presumably this refers to the staffs of maternity hospitals—about the care of the newborn baby, and the shortage of nurses, which results in infant nursing being left in the hands of pupil midwives with no experience of infants. Domiciliary midwifery gives a high degree of safety to both mother and child so long as two conditions are observed—namely, first-class antenatal supervision, and a close liaison with a maternity hospital whose staff, both obstetric and paediatric, are available for attendance at the patient's home when necessary. On the other hand, institutional midwifery is growing in favour—in London at least 70% of births take place in hospital—and, excluding emergency admissions, the results for both mother and child in well-conducted hospitals are better than those for the country as a whole. Recommendations are made for the planning and conduct of maternity hospitals. It is urged that all newborn babies should be in general charge of a paediatrician with experience in the work. He should be a "full" member of the staff and advise on the general paediatric policy of the hospital in close co-operation with the obstetricians and with the public health medical officers of the district.

The report concludes with certain general recommendations. Some of these concern the diet of the mother. It is considered that dietary supplements should be provided for the pregnant woman no less in peace than in war—"one well-balanced meal a day in a restaurant or canteen"—lest other members of the family should benefit at her expense. Finally, three suggestions for research: (1) medical reports of all maternity hospitals should be standardized and include comprehensive accounts of neonatal as well as maternal results; (2) post-mortem examination of babies born dead or dying in the neonatal period should be the rule; and (3) the accepted standards of immaturity and prematurity should be generally adopted, with notification and follow-up of all cases.

THE NEW HOUSE OF COMMONS

The House of Commons which was destroyed by air attack in 1941 was never successfully ventilated. Originally the ventilation was carried out by taking in air at a high level in the Victoria Tower and the Clock Tower, warming it, and carrying it to the space under the House itself, whence it rose through a floor-grating into the chamber. Committees sat at various times to consider the ventilation of the House, and minor rearrangements were made, but in 1913, in evidence before a Select Committee, Dr. (now Sir Leonard) Hill still criticized the system as likely to produce that most undesirable condition in legislators, cold feet and hot heads. After the destruction of Barry's building, Sir Giles Gilbert Scott was asked to prepare plans for a new chamber, and he invited Dr. Oscar Faber to advise on the electrical and mechanical installation, including ventilation and heating. In a lecture to the Institution of Structural Engineers on Feb. 24 Dr. Faber gave an interesting account of the elaborate arrangements which have been made to ensure that Members of Parliament in the future shall breathe a properly conditioned atmosphere.

The new chamber will be of almost the same size as the old, but the accommodation above, under, and around it for Members, officials, and reporters will be greatly enlarged. The seating accommodation in the galleries of the House itself will be extended, so that the total number who can be seated will be 939, as compared with 802 in the old House. For the ventilation of the lower portion of the House air will be conveyed into the chamber through inlet ducts arranged in three tiers under the side galleries. The air will be introduced from each side in turn. When air is introduced from both sides simultaneously a notable turbulence is produced where the two streams meet. Further, by introducing the air first from one side and then from the other the unpleasant effect of a continuous air current will be to a large extent eliminated. Other air inlets are to be provided in the upper part of the chamber, and there will be provision for the extraction of vitiated air near the roof.

One of the difficulties of ventilating the House of Commons is the rapidity with which an almost empty House will fill up if a great speech or a lively interlude is expected. An attendance of a few dozen Members may become in a few minutes an attendance of some hundreds, necessitating a reduction in the temperature of the air admitted. Automatic thermostatic control would not make the necessary adjustment in time, and the engineers have fixed up a periscope whereby the man in charge of the control of temperature may anticipate events. Similarly, during a division, the admission of air to the lower part of the chamber will be automatically diverted to the crowded division lobbies.

The normal temperature in the House itself will be maintained at 67° F. (19.4° C.) in winter, and a little higher in summer. This in itself has meant some complicated engineering in view of the fact that the outside temperature in the course of the year may range from 25° F. to 88° F. (−4° C. to 31.1° C.). The relative humidity will be kept at 50–60%. Some 24,000 cu. ft. of air will be introduced into the chamber every minute, compared with the 40,000 cu. ft., according to Sir Leonard Hill, which was introduced into the old chamber and which he found to be excessive. This admission of 24,000 cu. ft. a minute is equivalent to the changing of all the air in the chamber eight and a half times an hour. The reduction of temperature and humidity will be obtained by passing the

incoming air over cooling coils in the various air-conditioning plants. There are eight separate ventilation plants in the building. The air entering the House will be made to travel horizontally and not vertically; this corresponds more closely to the natural conditions of ventilation in the open air. The chamber itself will not require special heating, being adequately warmed by the air-conditioning plant, but heating will be provided in all the external rooms of the building, some of it in the form of panel-heating, some in the form of radiators and convectors, and in the lobbies there will be open fireplaces.

BRITISH PHARMACOPOEIA, 1948

CORRIGENDA

The following corrigenda in the first issue (September, 1948) of the *British Pharmacopoeia, 1948*, have been prepared by the British Pharmacopoeia Commission and approved by the General Medical Council.

page	line		
15	36	*for* 114°	*read* 115°
51	13	*for* 185	*read* 194
	15	*for* 2·0	*read* 3·0
54		*delete* lines 15–19	*insert* Water-insoluble matter. Place 1 g. in a stoppered flask with 120 ml. of *water* at 25°, and shake frequently during two hours, maintaining the temperature at 25° throughout; filter through a Gooch crucible, which has been prepared with asbestos, dried at 100° and tared; wash the residue on the filter with 25 ml. of *water*, and dry at 100°; the residue weighs not more than 15 mg.
89 *after* 42			*insert* Foreign organic matter. Not more than 2·0 per cent., page 780.
118	9	*for* 97·0	*read* 96·0
122	28	*for* 0·12 to 0·2 G. 2 to 3 gr.	*read* 0·12 to 0·25 G. 2 to 4 gr.
153	26	*for* Peniicllin	*read* Penicillin
197		*delete* the paragraphs under "Diastatic value"	
258	31	*for* Hexodarditone	*read* Hexobarbitone
300	18	*for* Ether-insoluble resins, and Acid-value of ether-insoluble resins	*read* Ether-insoluble resins and Acid-value of ether-soluble resins
346	29	*for* 319·9	*read* 373·9
359	7	*delete* below the aqueous layer.	
364	21	*for* + 57° to + 60°	*read* + 36° to + 40°
386	3	*for* 3·0	*read* 4·0
440	35	*delete*, Each ml. of *N/10 sulphuric acid* is equivalent to 0·02852 g. of anhydrous morphine.	
490	45	*for* uniserial	*read* uniseriate
493		*delete* the paragraph under "Colophony"	
539		*delete* lines 9 and 10	
565	26 and 30	*for* Storax	*read* Prepared Storax
574	5	*for* and	*read*, allow to stand for fifteen minutes and add
	7 and 8	*delete*, after standing for fifteen minutes,	
586	33	*for* prepare	*read* prepared
	34	*for* he	*read* the
629	14	*for* w/v	*read* v/v
654	39 and 40	*for* (approximately 36·5 per cent. w/w of HCl).	*read* diluted with *water* to contain approximately 32 per cent. w/w of HCl.
767	9	*for STORAX*	*read PREPARED STORAX*
784	23	*delete* hydrochloride	
802	14	*for* L† and the L_0	*read* L†/$_5$ and the L_0/$_5$
	16	*for* L†	*read* L†/$_5$
	20	*for* L_0	*read* L_0/$_5$
	24	*for* L† and L_0	*read* L†/$_5$ and L_0/$_5$
	45	*for* L†, L_0	*read* L†/$_5$, L_0/$_5$
	48	*for* L†, L_0	*read* L†/$_5$, L_0/$_5$
803	5	*for* L† dose, or 1 L_0	*read* L†/$_5$ dose, or 1 L_0/$_5$
	8	*for* L†	*read* L†/$_5$
	10	*for* L_0	*read* L_0/$_5$
808	48	*delete* hydrochloride	
847	17	*for* Storax	*read* Prepared Storax
860	61	*for* L	*read* L†
	64	*for* L†	*read* L†/$_5$
	65	*for* L_0	*read* L_0/$_5$
873	61	*before* Tetanus	*insert* L_0/$_5$ Dose,
874		*delete* line 3	
		after line 4	*insert* Tetanus Test Toxin . . . *802*
890 *after* 30			*insert* Prepared Storax, Determination of Balsamic Acids in . *767*
902 *after* 51		*delete* line 50	*insert* Storax, Prepared, Determination of Balsamic Acids in . *767*

Correspondence

The National Formulary

SIR,—The publication of the *National Formulary* should materially assist the co-operation between hospitals and general practitioners which everyone desires, and it is hoped that hospitals will adopt it instead of their private formularies. It is realized, however, that the staffs of teaching hospitals may have some misgivings about placing it without comment in the hands of medical students, since it contains preparations which can justifiably be criticized. We, who are members of the Committee and are especially interested in the teaching of medicine, feel that it is desirable to explain why a compilation on which much time has been spent by so many well-informed individuals falls short of the ideal.

The purpose of the *National Formulary* is primarily to ensure that the intentions of the prescriber are effectively carried out. The *Formulary* reflects a picture of the present state of practical therapeutics, and every preparation included in the list is there because it has been demanded or approved by some representative body which has been consulted. The Committee has felt obliged to insert many items of which some of its members disapprove, but the *Formulary* does contain practically all the effective drugs, apart from anaesthetics, used in modern medical practice.

We should like to anticipate some of the more obvious criticisms. Though the number of mixtures has been kept low, there are still many which have almost identical actions. Thus there seems little justification for the inclusion of both alkaline and acid mixtures containing on the one hand gentian and on the other nux vomica, since the dose of 1/90 gr. (0.72 mg.) of strychnine present in the latter can act only as a simple bitter. The preparation mist. strych. et ferr., on the other hand, which contains 1/36 gr. (1.8 mg.) of strychnine hydrochloride, also contains iron as ferric chloride, and this is not a satisfactory method of prescribing iron. This group, which is commonly prescribed as "tonics," is difficult to assess scientifically. Its members are given in many instances as placebos. Polypharmacy has been avoided as much as possible, in accordance with the modern tendency to include only a few active drugs in a single preparation. Some exceptions, however, remain such as mist. gelsem. et hyoscy. co. and caps. vitaminor., and it has been necessary to retain some time-honoured preparations the use of which can be criticized. Guy's pill for example, though an efficient preparation, does not enable the prescriber to vary the dose of digitalis and mercury separately. Greater flexibility is achieved if digitalis and inj. mersalyl. are used independently.

It is difficult to find pharmacological justification for a few preparations, as, for example, inj. strych. hydrochlor. (except in barbiturate poisoning, and here other drugs are preferable), lot. plumb. evap., lin. aconit. bellad. et chlorof., tab. papaveret., and elix. caffein. iod.

In the Children's Section, attention has been paid to palatability, but some preparations betray excessive caution in dosage. Linct. scill. opiat. pro infant., for example, contains 1/444 gr. (0.14 mg.) of morphine per dose, and it is doubtful if the 1½ gr. (0.1 g.) of chalk which is the sole active ingredient of mist. cret. pro infant. can have much effect.

The percentage composition of many preparations is given in the *Formulary*. Some preparations such as crem. zinc. et ichtham. are made up from a prescription written in the Imperial system, and others such as crem. zinc. are compounded on a percentage basis. When converted from one system to another this has led to fractional percentages in the first instance, and odd numbers of grains in the second. It would have been better if a consistent method, and preferably the percentage method, had been used throughout.

It is inevitable, however, that a compilation of this type cannot at the same time seem equally satisfactory to the pharmacist, pharmacologist, the scientifically minded physician, and the general practitioner. Perhaps it is as good a compromise as could at present be achieved. If the *Formulary* is adopted by all hospitals it will undoubtedly assist in co-ordinating specialist and general practitioner treatment, and future editions will benefit by the informed criticism of hospital staffs.—We are, etc.,

A. E. BARNES. D. HUNTER.
D. M. DUNLOP. E. J. WAYNE.
P. HAMILL.

Official History of the 1939–45 War

SIR,—The writing of the official medical history of the 1939–45 war proceeds. The raw materials out of which it must be built are the reports and the like which headquarters of formations and units were required to send back to the War Office during the war years. These proffer in great abundance factual information, which must, of course, guide the historian's pen. But these reports were addressed to the War Office and not to posterity; they tell of what was encountered and of what was done, but seldom do they reveal the reasons for action or disclose its results. They give no expression of the thoughts or feelings of those concerned.

This history, when written, must be more than a mere chronicle, it must distil wisdom out of the experience of a generation so that those who follow can, if they so wish, profit. Blood is well shed if it is to be used in such transfusion.

There must be many who served with the R.A.M.C. who can help very materially if they will but unlock the door of memory or hunt out the diaries of those days and tell of what they know. This is more particularly the case in those campaigns that ended in tactical defeat—France 1939–40, Norway, Greece, and Crete—for there was much burning of papers, and all that remains to be read is that which is deeply engraved upon the minds of those who served and endured. Then there were the relatively undramatic but nevertheless important affairs in Madagascar and Paiforce, the isolation of those in West Africa, concerning which there is but little on record.

In this building of a comprehensive and significant picture out of a great mass of apparently unrelated little bits and pieces no information is without value, information not only about matters medical but also concerning the formations with which the medical services were associated. I shall indeed be grateful for any help that I can attract.—I am, etc.,

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F. A. E. CREW.

Treatment of Anuria

SIR,—Although Drs. D. A. K. Black and S. W. Stanbury (Dec. 25, 1948, p. 1101) head their article "The Treatment of Anuria" they state that they "exclude from present consideration anuria associated with a definite pre-existing renal lesion." Later it is not made clear whether the authors are discussing the treatment of anuria in general or only that of the more restricted group.

Whether the distinction between the two kinds of anuria matters in practice is doubtful, but it is important that some of the authors' remarks on treatment should not be taken to apply generally. The somewhat ambiguous and discouraging reference to alkali therapy, for example, may be justified in respect of some forms of anuria (though these are not defined), but it is certainly not applicable to all, or even to most. It would be disastrous if a method of treatment that has probably saved more lives in this condition than any other were to be discredited without good reason.

From the point of view of the efficacy of alkali therapy anuria may be divided into three groups: (*a*) that in which, in experienced hands, it is generally successful; (*b*) that in which it is sometimes successful and sometimes not; and (*c*) that in which it generally fails.

Group (a).—Twenty years ago[1 2] I referred to a small but consecutive series of 24 cases of anuria, in only one of which alkalis failed to restore urine flow. In most, though not in all, the anuria arose as an incident in the course of pre-existing renal disease, mainly the later stages of glomerulonephritis, chronic pyelonephritis, pre-eclampsia, and the like. In many renal function was already severely impaired. My subsequent experience of alkalis in this type of case has been similar. In 1911 and 1912, nearly twenty years earlier still, Fischer[3] was having similar success with alkali therapy in the same type of case, though using a different technique.

Alkali therapy may be equally successful in anuria when the kidneys were previously normal, for it has long been known to be the most effective means of treating anuria resulting from mercury and other metallic poisons. Weiss,[4] for example, describes some thirty successes and only two failures with this method, and I have seen successful results in anuria associated with such non-metallic "poisons" as chloroform, jaundice, and scalds.

Spontaneous re-establishment of urine flow may happen at any time, as the authors rightly observe, but I doubt if it occurs in as high a proportion of untreated cases as in those cited.

Group (b).—This corresponds broadly with the varieties of anuria attributed by Maegraith and his colleagues[5] to "renal anoxia." It occurs in incompatible blood transfusions, blackwater fever, the crush syndrome, and a number of other conditions in which the kidneys are usually previously normal. The value of alkali therapy in this group, by no means small, appears to vary considerably both in the several disorders and in individual patients. Alkalis are commonly recommended in the crush syndrome and in blackwater fever, presumably because they are found to be more effective than other available methods. I have little personal experience of their use in these conditions, but perusal of the literature gives the impression that the results of alkali therapy are least dependable in anuria associated with intravascular haemolysis.

Group (c).—So far as I am aware the only type of anuria in which alkali therapy is positively contraindicated is that associated with, or due to, alkalosis.

On the whole it would not seem to be an overstatement to assert that alkali therapy is highly successful in many forms of anuria and of value in most, but that when anuria is due to intravascular haemolysis the outcome is uncertain. Furthermore, so far as I am aware in no form of anuria (other than that due to alkalosis) has any alternative method been shown to give consistently better or even comparable results. I agree, of course, that alkalis may prevent haemoglobin precipitation, will not destroy casts already formed, and that tubular blockage is probably not an important cause of anuria, but I would suggest that they are no longer given mainly for these reasons.

Alkalis probably act in anuria in three ways. (1) Pre-renally. Anuria is generally, either previously or sequentially, associated with disturbances of the acid-base balance, usually, though not always, in the direction of an acidosis. Body water is more readily mobilized when the acid-base balance is within the comparatively narrow normal limits (in this respect)—the "critical level" of the alkali reserve described by Andrews[6] in animals and by the writer[1] in humans. (2) On the glomeruli, by drawing fluid osmotically into the circulation, so that all but severe degrees of renal vasospasm are overcome and filtration is re-established. Whether or not *urine* is then formed will depend upon the functional state and circulatory efficiency of the tubules. (3) On the tubules, by osmotically preventing excessive reabsorption.

There is another reason for selecting alkalis in preference to other osmotically active substances such as sodium chloride or sulphate, glucose, gum, or plasma—all of which will sometimes serve if the acid-base balance is normal or is first made normal. When the kidneys are out of action oral (or if necessary rectal) medication ensures gradual adjustment of water–salt balances (i.e., at optimum rates), and alkalis are almost the only suitable substances that can generally be tolerated by mouth in effective doses.

If proper precautions are adopted the risk of causing significant alkalosis with alkali therapy is almost negligible. It has not occurred in any of my cases of anuria. In emergency the desperate nature of the condition would seem to justify the moderate risk involved in giving alkalis without elaborate precautions, provided they are used with circumspection.

There would seem to be no reason why alkali therapy should not be supplemented by some form of splanchnic block if necessary, and, if no response is then obtained and the anuria has persisted for longer than about a week, one of the methods of extrarenal elimination mentioned by the authors should certainly be instituted.

The danger of causing potassium poisoning from the use of potassium salts in these cases (referred to in your leading article (p. 1111)) is in my opinion much exaggerated. The indiscriminate use of potassium in anuria is, of course, indefensible, but combined with suitable quantities of sodium the risk of potassium poisoning is greatly lessened, and in practice the advantages to be gained from the judicious use of potassium salts are not lightly to be forgone, but this is another story.

While it is unlikely that any method of treatment will prove to be equally effective in all forms of anuria, I submit that none has yet been shown to be so generally successful as alkalis. Alkali therapy, however, like insulin or the surgeon's knife, is essentially an instrument of precision. In a sporadic disorder such as anuria what is required is a method that can be applied effectively and with safety by anyone anywhere. It is

urgently necessary, therefore, that the search for alternative methods should be continued with vigour. The paper by Drs. Black and Stanbury is a notable contribution to this end.—I am, etc.,

London, W.1 A. A. OSMAN.

REFERENCES

1 *Guy's Hosp. Rep.*, 1926, **76**, 412.
2 *Lancet*, 1928, **2**, 1233.
3 *Oedema and Nephritis*, 1921, pp. 696 *et seq.* New York.
4 *J. Amer. med. Ass.*, 1918, **71**, 1045.
5 *Lancet*, 1945, **2**, 293.
6 *Arch. intern. Med.*, 1926, **37**, 82, 559.

SIR,—From his letter (Feb. 12, p. 282) it appears that Mr. R. H. Paramore has misread, and consequently misinterpreted, my letter on this subject (Jan. 22, p. 151), in which I dealt with alterations in the intrarenal circulation in renal cortical necrosis and in the lower nephron damage syndrome.

The renal arterial architecture is a simple tree-like dichotomous arrangement of the branches of the principal renal artery, which, coursing between the pelvis and renal substance, break up acutely into *interlobular* arteries, which in turn as they approach the cortex divide rapidly, abruptly, and completely into very fine straight branches, the *intralobular* arteries, which run perpendicularly to the surface as they penetrate the cortex. This abrupt division of comparatively large arteries into very small ones which are really end-arteries (since they give off the afferent glomerular arterioles) provides for the relatively high pressure necessary for filtration in the glomerular vessels.

It should now be obvious that "vasoconstriction in the renal arteries brings about greatest reduction in the calibre of the cortical (intralobular) arteries" and consequently reduction of blood flow to the majority of glomeruli in the outer- and mid-cortex, whose afferent arterioles arise from these vessels. At the same time—the larger interlobular arteries suffering lesser reduction in calibre—the blood flow to the most proximal glomeruli is relatively unaffected, and when the renal blood flow per minute is normal or even slightly reduced the volume and velocity of flow in the juxtamedullary glomerular capillaries are increased. The effect on urine formation consequent on severe reduction of filtration surface will be readily appreciated.—I am, etc.,

London, N.18. J. F. HEGGIE.

Bronchography and Surface Analgesia

SIR,—Dr. Ewan F. B. Cadman (Feb. 19, p. 324) very properly draws attention to the fact, still only too little known, that it is unnecessary to anaesthetize the tracheal and bronchial mucosa for bronchography; the radio-opaque oil runs easily without producing any mucosal stimulation.

At the same time he uses a peculiarly unfortunate aphorism considering he himself advocates the method of cricothyroid puncture, which is unnecessarily dangerous, more complicated, and gives no better results than the far simpler and safer aspiration methods by which the oil is introduced directly through the nose or into the pharynx. He quotes, "Treating the sick is like boring holes in pearls, and the physician must act with caution lest he destroy the pearl committed to his charge." I suggest the cricothyroid membrane be considered as a pearl, and we should avoid boring holes in it when Nature has already provided a very large and more convenient aperture in the glottis itself.

I and my residents have been doing bronchograms for nearly twenty years, aggregating many hundreds of bronchograms of, I like to think, a very high standard. I have never allowed a patient of mine to suffer cricothyroid or tracheal puncture for this purpose, and I find my newest residents, after a few minutes' simple instruction, secure bronchograms by the nasal aspiration method which leave nothing to be desired.

The amount of surface anaesthesia used is small and varies with the whim of the operator and the disposition of the patient. Some surface anaesthesia makes for greater comfort and confidence. It is, in fact, not essential to have any surface anaesthesia at all, for while I was working in the chest service at Barnes Hospital, St. Louis, in 1930 large numbers of bronchograms were done by myself and other assistants without any form of preparation owing to the fact that an earlier case of cocaine hypersensitivity had occurred. A good bronchogram can be obtained in this way in about two-thirds of the cases; for the rest some form of surface anaesthesia is needed.—I am, etc.,

London, W.1. R. C. BROCK.

Surface Analgesia for Bronchoscopy

SIR,—Now that your numerous correspondents on amethocaine have again reiterated the pious and time-honoured precautions for the use of the cocaine derivatives it may be useful to draw attention to an analgesic which really is safe and possibly—I do not know—foolproof. Ten years ago I gave up cocaine for the safer butethanol (2%). But, in spite of always giving 3 gr. (0.2 g.) of phenobarbitone beforehand and having a solution of "pentothal" ready in case of toxic effects, patients frequently got pallor and faintness and, once or twice, convulsions. These were cut short by the immediate injection of pentothal.

Four years ago I started using "butyn" (2%). So safe is it that I now always allow, even encourage, the patient to swallow it, seldom use less than 3 ml. in the laryngeal syringe for the larynx and trachea (squirting 2 ml. between the cords), and never hesitate finally to use a liberal dripping swab of the solution for the left bronchus if it should have escaped its due meed. The anaesthesia is not very rapid, but is established by the time one has again read the patient's history and studied the radiographs. I hardly ever use a general anaesthetic as well. Although not quite as quick and powerful as cocaine or butethanol it is perfectly adequate, and not once in 900 or so bronchoscopies and oesophagoscopies in the last four years have I known it cause any toxic reaction.—I am, etc.,

London, N.18. IVOR LEWIS.

Overdose of Surface Analgesics

SIR,—Col. L. W. Harrison (Feb. 12, p. 282) reminds us of the advantages gained by adding 1% sodium bicarbonate to a weak solution of cocaine immediately before it is instilled into the urethra. This simple aid, however, does not apply to local anaesthetic drugs used for infiltration. Quite apart from the technical difficulties in the sterilization of sodium bicarbonate, the empirical addition of equal volumes of a 1% solution of this drug to procaine, amethocaine, or cinchocaine in the concentrations in which they are normally used does not give uniform results; in many cases an immediate precipitation of anaesthetic base renders the solution inactive.—I am, etc.,

Oxford. R. BRYCE-SMITH.

Self-administered Trilene Analgesia

SIR,—Dr. J. T. Hayward-Butt (Feb. 26, p. 364) and Mr. F. Neon Reynolds (Sept. 25, 1948, p. 620, and Oct. 23, p. 761) have failed to appreciate these facts: (1) in chemical composition trilene is very similar to chloroform; (2) at the outset of the use of trilene it was thought that some of the complications following chloroform anaesthesia might occur. In particular, any cardiac irregularity, especially that of sudden death due to vagal inhibition, was looked for. No case was reported and this drug rightly acquired a reputation for safety.

The possibility of sudden catastrophe has always remained. During the last twelve months I have had described to me the details of the sudden deaths of two fit female patients aged 26 and 32 years respectively, both of them when held at a light level of trilene anaesthesia, and immediately following initial surgical stimuli. I have never undertaken any special work on trilene myself, nor am I in any official position to offer advice to the College of Obstetricians. But with the knowledge of those two fatalities in my mind I beg to urge those workers who do have the responsibility of advising the authorities to stand firm and not to allow trilene to be administered by a midwife, or by the patient herself, through any type of inhaler which is capable sometimes of producing light surgical anaesthesia.

Since sudden and fatal vagal inhibition has occurred in the past following surgical stimulation under trilene anaesthesia, therefore without any possibility of doubt it will occur again. And so it will not advance the usefulness of anaesthesia or aid the safety of future women in labour for Dr. Hayward-Butt

and Mr. Neon Reynolds to clamour loudly for the general use of this drug.

Those who have the responsibility of advising and conducting research on obstetric analgesia should be praised with thankfulness for their insistence on safety above all other advantages, and their steadfast refusal to listen to the strong words in the medical and lay press of a few enthusiasts.—I am, etc.,

London, N.W.8. R. W. COPE.

Ectopic Gestation

SIR,—I have read with great interest the article on ectopic gestation by Drs. J. S. MacVine and D. H. Lees (Feb. 12, p. 263). During my stay in Great Britain I have been always amazed how low, fortunately, is the incidence of ectopic pregnancy in this country. The number of 107 cases treated in "a busy municipal hospital" in London over a ten-year period confirms my opinion, since, for instance, the number of ectopic pregnancies in a municipal hospital in Cracow amounted to at least 650 cases in a like period before the war.

As the pelvic infection diseases are also much fewer than on the Continent as a whole, the great role of the inflammatory factor in ectopic gestation appears to be very likely. At the same time this explains why the rate of the inflammatory factor was so low in the authors' survey. On the other hand, it should be pointed out that it is insufficient to take under consideration only such gross lesions as adhesions, hydrosalpinx, and similar, which lead usually to sterility. Rather the small post-salpingitis lesions in the structure of the tube wall, which often could be revealed only by microscopy, are the predisposing factors of ectopic gestation. Regarding the other causations of ectopic gestation, I should like to quote in support of the authors' opinion the view of Jakowicki—who collected a great number of cases in which abortion was attempted by quinine, ergot, and hot baths—that the tubal spasm caused ectopic gestation in his series. Underdevelopment undoubtedly also plays a role, and I remember several cases in which the ectopic pregnancy was evidently due to the very characteristic long, thin, and straight tubes, although I quite agree with the authors that the percentage of such cases is proportionately low.

The sphere of diagnosis is no doubt the most important. I cannot agree wholly with evaluation of the various symptoms and physical signs given by the authors, but the space of this letter does not permit me to discuss this question. So I should like only to point out the value of the most effective method in diagnosing ectopic pregnancy—namely, the puncture of the pouch of Douglas—which was not mentioned by the authors. The diagnosis can be confirmed in all cases in which blood is present in the free abdominal cavity, in Douglas's pouch only, or if the blood is forming a haematocele near it: that means practically all cases of ectopic pregnancy. This was a routine method in the Cracow University clinic for women's diseases. A special technique of this puncture is required to ensure good results. The diagnosis is based on the presence of small dark clots which are visible on the white surface of the gauze after spraying out the contents of a syringe.

Although the majority of cases are easily diagnosed by experienced gynaecologists, there are many dubious cases with no characteristic symptoms and signs. The differential diagnosis between pelvic inflammation and extrauterine pregnancy is especially of great value for those who believe in the significance of conservative treatment of inflammation of the uterine appendages. Puncture of the pouch of Douglas solves the difficulties in diagnosis in a few minutes.—I am, etc.,

London, W.3. C. UHMA.

SIR,—As Drs. J. S. MacVine and D. H. Lees said in their excellent review of 107 cases of ruptured ectopic gestation (Feb. 12, p. 263), the subject is always of interest to the general surgeon responsible for emergency abdominal work. Between 1926 and 1928 I operated on twelve such cases which in signs and symptoms conformed well to the typical features of the condition. In two, however, an incident was encountered which was not mentioned in the paper under review or in the textbooks—namely, that in each instance the embryo was still living. Amongst free bloodclot removed from the pelvis was found the characteristic embryo of about 4½ weeks—i.e., with caudal and cephalic prominences, and underlying the latter was the actively beating primitive heart, looking like a little pulsating red spot. In both cases the gestation was tubal, and in neither had there been any warning vaginal haemorrhage.

Under the circumstances of emergency it is obviously pure chance that one identifies the embryo at all, yet it occurs to me that if sought for it must not infrequently still be in the living state. It would be interesting to hear the comments of gynaecologists on this experience.—I am, etc.,

Birmingham. F. A. R. STAMMERS.

Infected Finger Treated with Penicillin

SIR,—The following observations on a case of tendon-sheath infection treated with penicillin are prompted by Mr. Gordon A. Barclay's excellent article (Jan. 29, p. 175).

A woman reported on Dec. 19, 1948, with a swollen, throbbing left middle finger. Two days before, a cat had scratched the distal interphalangeal crease, and 36 hours later the finger became painful and began to swell. On examination the finger presented all the signs of an acute tendon-sheath infection—uniform swelling, "signe de crochet," pain on attempting extension, and tenderness over the proximal ampulla. With some trepidation it was decided not to send her to hospital, but to treat with systemic penicillin. From Dec. 1 till Dec. 3, 600,000 units were given daily in three doses at 4-hourly intervals. From Dec. 4 till Dec. 6, 400,000 units were given daily in two doses—night and morning. By 6 p.m. on Dec. 1 the throbbing had ceased. The "signe de crochet" disappeared during Dec. 2. On Dec. 3 the tenderness over the ampulla had gone and the patient was able to flex and extend her finger with very little pain. She was still tender over the distal phalangeal crease. On Dec. 4 she could flex her finger into the palm, but the terminal phalanx was numb and stiff. On Dec. 6 the finger was free from pain and to all intents normal. She went back to work on Dec. 8. The total dosage of penicillin was 3,000,000 units.

—I am, etc.,

Borrowash, Derby. G. S. NEILSON DOW.

Vesico-vaginal Fistula

SIR,—Recently we had a case of vesico-vaginal fistula and found difficulty in visualizing the opening in the vagina. Dye welled up and flooded the vagina before accurate localization could be obtained. We injected air slowly into the bladder with the patient in the lateral position, and a steady stream of air bubbled through the water in the vagina, clearly showing us the fistula. I would be interested to hear if this method has been used by others as an aid to the localization of vesico-vaginal fistulae.—I am, etc.,

Royal United Hospital, Bath. D. T. R. EVANS.

Ankylosing Spondylitis

SIR,—It was with great interest that I have read Dr. N. R. W. Simpson and Surgeon Lieutenant C. J. Stevenson's article, "An Analysis of 200 Cases of Ankylosing Spondylitis" (Feb. 5, p. 214). I should like to offer my comments based on a study of 54 cases under my observation while in Bristol.

The cases which I have treated were divided into two stages: the early stage where the changes were limited to the sacro-iliac joints and sometimes also in posterior articulations, and the late stage where the spinal ligaments were involved. Following *x*-ray therapy, 95% of the early while only 65% of the later stage showed definite improvement. I stress the importance of the difference in response between those two groups, and I should like to make a point that ultimate results depend on whether the disease was of a mild or severe type at the time at which the treatment was commenced. Consequently the earlier the diagnosis is made the greater the success.

From my experience I found that the early cases have a greater benefit after the intensive method of treatment which was described by McWhirter in 1945. This consists of ten treatments given over a period of two weeks; treating the whole spine and sacro-iliac joints, the total skin dose is 2,500 r. I cannot say whether the disease was arrested, as I was not able to follow them up for a sufficiently long time, but it is my impression that many of the early cases show permanent results. I shall be interested to know the future findings of the authors. Furthermore, I have found the sedimentation rate a very valuable test in judging the progress of the disease, as in 70% of

my cases decrease of the E.S.R. was parallel to the decrease of symptoms.

Finally, I should like to add that co-operation between the radiotherapist and the orthopaedic surgeon is of prime importance. By synchronizing the treatments at their disposal, a crippled patient is usually converted to an able citizen.—I am, etc.,

Coventry. K. SICHER.

SIR,—In the *Journal* of Feb. 5 (p. 214) there appeared an article on ankylosing spondylitis by Drs. N. R. W. Simpson and C. J. Stevenson. Under the heading of "Initial Diagnosis" they make the following statement:

"Only 102 (51%) of the cases were admitted . . . with a correct diagnosis already made. This lends further weight to the suggestion of Gilbert Scott (1942) that *x*-ray examination of the sacro-iliac joints should be a routine investigation in all cases of persistent low back pain."

It is, of course, obvious that this should be done when there is "persistent low back pain," but I should like to point out that it was not with regard to this symptom that Scott discussed early diagnosis. His whole doctrine was that by the time there is back pain the disease is as a rule firmly established. He therefore advocated routine examination of the sacro-iliacs in all cases of "rheumatic" pain in young subjects. He maintained that the earliest symptoms were usually "wandering pains" in the limbs, of the type which used to be called "growing pains." Later experience has shown that the first symptoms are spinal more often than Scott thought; but the value of his observation remains. Many cases do show typical changes in the sacro-iliacs long before there is any complaint of back pain.

I end by quoting Scott's[1] actual words:

"An early stage of spondylitis should always suggest itself whenever a young robust adult, male or female, complains of recurrent attacks of rheumatic pains in any part *except the back* [italics Scott's]. Pathological changes—sacro-ilitis—as demonstrated by a radiographic examination will at once dispel any doubt as to the diagnosis."

—I am, etc.,

London, W.1. F. HERNAMAN-JOHNSON.

REFERENCE

[1] *Adolescent Spondylitis*, 1942. London.

Electrotherapy and Stainless Steel Sutures

SIR,—In the search for a satisfactory suture material the use of stainless steel and other metals has made a favourable impression clinically. In considering these sutures, however, there has been some concern as to the possible effects of electrotherapy on the tissues in the neighbourhood of such sutures due to oscillatory currents induced in them.

Theoretically a continuous suture of, say, 6 in. (15 cm.) in length, making a spiral of ½ in. (1.3 cm.) in diameter, with two turns to the inch, resonates with appropriate tuning apparatus in the region of 400 megacycles per second, corresponding to a wavelength of 84 cm. The suture line, in fact, constitutes a "coil" and would probably have a diameter more nearly ¼ in. (0.6 cm.), or even less, in the average line of sutures. In this case the resonant frequency might well be in the neighbourhood of 800 megacycles, a wavelength of 42 cm. These figures refer to an efficient coil in air or wound on an efficient former of ceramic material. In such a coil the heating effects, when it is in resonance with an applied radio-frequency oscillatory current, increase with the efficiency of the circuit (or "Q").

Where our "coil" is embedded in the tissues it is, in fact, short-circuited by a resistance of low value, not only across its ends but across every turn and, indeed, almost every molecule of its structure, for the tissue fluids consist of normal saline, which has a low resistance to electrical currents of any type. This has the effect of drastically lowering the "Q" of the resonant circuit, thereby reducing, if not indeed abolishing, any heating effects. The shortwave-diathermy apparatus works on a wavelength of six metres, or 50 megacycles, so that it seems that in no case is the line of sutures likely to resonate on its own directly with the applied radio-frequency.

The remaining possibility is that, fortuitously, the coil may resonate with one of the harmonics of 50 megacycles. In our theoretic calculation of 800 megacycles per second this harmonic would clearly be the sixteenth harmonic of six metres, and the amount of power available at such a high harmonic is very low. It is possible that the muscle, fascia, or other tissues round which the suture is applied may have the effect of lowering the resonant frequency of the suture coil, but it seems extremely unlikely that it would be of a lower harmonic than, say, the tenth, and the generation of heat seems to be a very remote possibility.

We already know what happens when metal is touched by the ordinary diathermy current, but that condition is not postulated when we are considering the use of medical diathermy in the treatment of various orthopaedic conditions. The same conditions which render the coil inefficient in a radio-frequency field obtain in the presence of ordinary medical diathermy, and it appears to me, therefore, that the generation of heat in any form of metallic suture when it comes into the field of either shortwave or ordinary diathermy treatment is extremely unlikely.—I am, etc.,

Dorchester, Dorset. T. RUSSELL STEVENS.

Carbuncle of the Kidney

SIR,—I think you will agree that instances of ordinary staphylococcal infection in the form of boils, whitlows, and carbuncles is in these days on the increase. Whether or not this is due to lack of vitamin A or other anti-infection factor in the diet is difficult to say, but while most of these infections are treated by incision, chemotherapy, or both, I had a case of carbuncle of the kidney a week or two ago which I rather feel merits publication. In the past carbuncle of the kidney has been looked upon as an extremely rare condition, and no doubt this has been so, for even to-day it remains uncommon. As sepsis generally is rather on the up-grade it is quite probable that carbuncle of the kidney may crop up more frequently than in the past.

The case about which I am writing is of a female patient aged 35 years who was admitted to High Wycombe Hospital suffering from acute abdominal pain, sickness, and high fever, together with a large mass in the right hypochondrium and the right lumbar region. She gave a history that two months previously she gave birth to twins, and whilst pushing them in their pram she had been seized with sudden pain and had just managed to get home. Her doctor diagnosed an enlarged liver, with possibility of gall-bladder infection, and sent her to hospital.

On examination the patient was acutely ill, temperature 103° F. (39.4° C.), pulse 110, with a dry tongue, and she complained of great pain in the right side. Examination was difficult on account of muscular rigidity, but it was possible to feel a large mass which appeared to be kidney. An *x* ray was taken, but showed what might have been a small ureteric calculus where the ureter crosses the rim of the pelvis. The shadow was a little bit far out, but as the ureter in pregnancy often tends to become kinked this was taken to be the possible explanation of the stone being rather farther out than usual. Examination of the urine revealed a few pus and blood cells. The white count was 20,000 per c.mm.

As the condition of the patient was deteriorating a diagnosis of pyelonephritis secondary to urinary obstruction above the calculus was made. As drainage of the kidney seemed necessary to save the patient's life the kidney was approached by ordinary lumbar incision. Apart from being rather bulky, with oedema of the perinephric fatty tissues, the pelvis of the kidney was quite normal, and there was no indication of what the lesion might be until the whole kidney was turned out of the wound, when on the posterior surface of the kidney was found a typical carbuncle of about ½ in. (1.3 cm.) in diameter.

As the old teaching has always been that the kidney should be removed for carbuncle I was in rather a dilemma, as for one thing it did not seem sufficiently diseased and for another I did not know the condition of the other kidney. The carbuncle was therefore treated by excoriation and insufflation with penicillin and sulphonamide powder, and the kidney was then replaced in position. The patient was then returned to the ward, after a small drain had been placed down to the site of the carbuncle, and intensive injections of penicillin commenced at the rate of 200,000 units three-hourly. Under this and general treatment the temperature rapidly settled, and on the sixth day, by which time she had received close on 8,000,000 units of penicillin, the temperature was normal and the penicillin was discontinued. Nothing drained from the wound, so the rubber drain was removed after 24 hours. The patient made an uninterrupted recovery.

The interesting point about this case is that should a carbuncle of the kidney be suspected it would be well worth trying intensive penicillin treatment before resorting to operation. Usually carbuncle of the kidney is suspected because infection in some

other form in the body, such as whitlows, otitis, or similar infection, gives a hint, but in this particular case there was no such infection at all, and it seemed rather strange that a carbuncle should occur in the kidney so shortly after the patient had had an uncomplicated twin delivery.—I am, etc.,

High Wycombe, Bucks. R. A. KILGOUR WIENER.

Corneal Graft Surgery

SIR,—I have just read Mr. B. W. Rycroft's reply (Dec. 25, 1948, p. 1119) to my letter (Dec. 4, p. 999) urging the establishment of an eye bank in London, and find it disappointing. I maintain that an eye bank is more necessary in the heart of the British Empire than in New York. Action must be taken at once to set one up. Its functions would be: (1) to provide corneal material for transplantation; (2) to act as a research institute; (3) to provide training in the technique of corneal grafting, which should be done on animals. It was disappointing to one who loves England as much as I do to find no eye bank for sight restoration there.—I am, etc.,

Wembley Park, Western Australia. F. W. SIMPSON.

Carcinoma of Cervix

SIR,—Mr. W. Sampson Handley (Jan. 22, p. 156) says that circumcision or "universal dorsal preputiotomy" will give the female protection against cervical carcinoma. This is considered by some to be a controversial issue, and, while we are consulting the psychologists on the effects of physical and mental trauma on the youth of the nation inflicted before they have an opportunity to express their own opinion, why not put the stress on education in personal cleanliness? Many otherwise intelligent people who wash their necks and behind the ears every day have a strong resistance, which perhaps a psychologist could also explain, to retracting the foreskin and applying soap and water.—I am, etc.,

Philadelphia, Pa. C. A. FORSSANDER.

SIR,—Surely it is unscientific to compare Jews with a mixed group of circumcised and uncircumcised Western Europeans and with other racial and linguistic groups. If one desires to know whether circumcision appears to have any effect upon the incidence of carcinoma of the cervix and penis are there not a sufficient number of males in these islands alone who have been circumcised during the neonatal period and who are therefore available as controls? All that remains is to collect the statistics.—I am, etc.,

Belfast. F. R. KINKEAD ALLEN.

Dislocation of the Hip-joint

SIR,—Reading the interesting account of a dislocation of the hip-joint at rugger by Mr. R. Salisbury Woods (Feb. 12, p. 272) recalled to my mind a similar case I saw many years ago whilst acting as house-surgeon at Oldham Infirmary.

The patient, a football player and a man of powerful physique, was admitted to the accident room straight off the football field with a vague history of a leg injury. He was sitting upright on the stretcher, his body bent forward as far as possible, the knee flexed, and the thigh adducted and fully flexed on the abdomen. In this position he said he was perfectly comfortable, but any attempt to move him or get him to lie flat gave him agony. A very brief examination only was possible, but it was pretty obvious that he had a dorsal dislocation of one hip-joint.

Chloroform had to be administered as he sat on the stretcher. He was next laid on the floor on a mattress, and under deep anaesthesia reduction was completed without great difficulty by flexion of the thigh on the abdomen followed by outward rotation. Recovery was rapid and uneventful.

The patient gave a short but very precise account of what had happened. The weather conditions were bad; rain was falling, and the ground was more sticky than slippery. Immediately before being hurt he found both feet immovably fixed in sticky mud with his body bent forwards. At that moment another player jumped on his back and he felt sudden acute pain in the hip before the two men fell in a heap.

This was his story, and at the time I found it difficult to explain the injury in such a muscular man. I formed the opinion (wrongly, in view of Mr. Salisbury Woods's clear explanation) that, the limbs being a complete fixture and the body bent, the impetus of a heavy weight suddenly thrown on the back thrust or jerked the pelvis forward sufficiently to allow the head of the femur to leave the acetabulum.

Mr. Salisbury Woods refers to the fact that dislocation of the hip is uncommon. In my own experience of forty-seven years of practice in hospital and in a mining community, where accidents of all kinds are frequent, I saw only one other dislocated hip—in a miner who was buried by a fall of coal and who sustained a fracture of the mid-dorsal spine and dislocation of the left hip. Owing to the flaccid paralysis and loss of sensation in both lower limbs I found reduction quite easy without any anaesthetic.—I am, etc.,

Edinburgh. JOHN MCKENZIE.

POINTS FROM LETTERS

Cog-wheels

Dr. G. C. PETHER (Hadley Wood, Barnet) writes: Dr. Eustace Chesser (Feb. 19, p. 325) dares to suggest that the well-ordered world of the planners may not after all be a complete food for the starving nor drink for the thirsty. . . . In my opinion many people are also emotionally insecure because they are unable, or the State will not allow them, to become complete individuals. . . . How can a man remember or appreciate the fact that his half-pint helps to send Bobby to school? The planners pretend that he does, and I do not believe it. Not long ago I wrote to the fathers of fifteen young factory workers who had failed to attend for the remedial exercises provided for their postural defects in the firm's time. Only one replied—the rest had apparently ceased to be fathers when their boys were about 15. This is the tragedy of planning, apart from the fantastic cost of remedial measures of doubtful value so ably demonstrated by Dr. Ffrangcon Roberts (Feb. 19, p. 293). The population for whom these measures are designed is in increasing danger in its personality, for when you give a man something (I will not use the word "free") you take something away from him. And deep inside him he resents it.

Robert the Bruce and Leprosy

Dr. G. L. KERR PRINGLE (Berkhamsted, Herts) writes: The interesting address by Sir William MacArthur at a meeting of the Section of History of Medicine at the Royal Society of Medicine on Feb. 2 (Feb. 19, p. 320) raises the question, Had the Bruce leprosy? Now at Liberton (Lepertown), a small village a few miles south of Edinburgh, there is a mineral spring dedicated to St. Catherine, which was said to have curative properties in leprosy and scaly skin diseases, and it is on record that the Bruce had treatment there on several occasions. I am sorry not to be able to give chapter and verse for this statement. The mineral spring contains a certain amount of petroleum, and oozes out from the shale-bearing strata which extends from Broxburn in West Lothian and ends at Liberton. The presence of petroleum in the mineral spring would no doubt be beneficial in the treatment of skin diseases associated with scales, such as psoriasis.

Amethocaine Hydrochloride

Dr. C. E. D. H. GOODHART (Carshalton, Surrey) writes: I have read with interest Mr. C. A. Jackson's article (Jan. 15, p. 99) and the subsequent correspondence. I would suggest that an additional way in which its toxic effects may be avoided is to limit the strength of the solution to 1%, which besides being as effective as the stronger percentage has the further advantage of being less likely to lead to overdosage.

Taking Children's Temperatures

Dr. A. A. MACDOUGALL (Glasgow, W.2) writes: Like Dr. A. Cyril Wilson (Feb. 12, p. 284) I too am surprised, but for different reasons, that no psychiatrist wrote to you at the time commenting on Dr. Joan Malleson's views (Dec. 18, 1948, p. 1078) on rectal temperature-taking. As do many others, I hope, I believe that homosexuality, vaginismus, etc., are found in such human subjects as are in some degree psychopaths, and only in such. My experience, both in general and psychiatric practice, leads me to protest against the implication that putting a thermometer in a rectum will ever make a psychopath of a normal person. The physician should be gentle and considerate, and avoid uncalled-for interference with parts which the normal patient, young or old, prefers to be left alone. That is why I oppose the rectal method. "All interferences with bodily orifices should whenever possible be avoided . . . being erogenous zones . . ." quotes Dr. Wilson. That would seem to rule out the mouth as well as the rectum. And what of the axilla? Is it not an erogenous zone too? And is not a thermometer a stark phallic symbol? Drs. Malleson and Wilson will have to consider whether they can continue at all to take temperatures.

Obituary

SIR WILLIAM HALE-WHITE, K.B.E., M.D., F.R.C.P.

Dr. Henry Robinson writes: May I be allowed to emphasize certain sides of Hale-White's career only lightly touched on in the obituary already published (March 5, p. 414)? I first met him as a consultant about forty years ago. I had been brought up as a student on his famous textbook, and was curious to meet the man himself. A more helpful, practical, friendly colleague I never met—he was a godsend to practitioner, patient, and the latter's family alike. Later I was his colleague for many years on the council of Epsom College, of which he was honorary treasurer for, I think, ten years. He was as much above the ordinary run of medical treasurers as he was outstanding among hospital physicians. He spoke little, but when he did his advice was always sound and courteous. During many years we met constantly at the Savile Club, where he was immensely popular with everyone. Here his book on Keats was highly appreciated; I heard one newspaper editor who was a member express surprise that Hale-White, whom he had known only as a physician, should be so accomplished a writer. When I told him that Hale-White's father had been "Mark Rutherford" he said that explained everything. Last year Hale-White spent a week or two in London and visited the Club almost every afternoon. He may possibly have had an enemy—but, if so, I never heard of one.

Dr. THOMAS REED, who died on Jan. 11 at the age of 64, had been in general practice in St. Leonards-on-Sea for nearly thirty years. He qualified at Guy's Hospital in 1920, and was for a time demonstrator in anatomy and biology there. In the same year he came to St. Leonards and joined Dr. G. H. Howe in partnership in general practice. Shortly afterwards he was appointed to the staff of the Buchanan Hospital, St. Leonards, as honorary physician, a position which he continued to hold until the time of his death. He was also a member of the board of management of the hospital for many years. Dr. Reed was honorary secretary of the Hastings Division of the B.M.A. from 1926 to 1934, and it was largely due to his efforts and enthusiasm that the Division became such an active one. He was elected chairman of the Division in 1935–6. His opinions and advice were greatly valued by his fellow practitioners, and particularly so at the meetings and discussions which took place before the inception of the National Health Service. After its introduction he was elected a member of the Hastings Executive Council. A freemason, he was a past-master of the St. Leonards Lodge, and also held high office in the Provincial Grand Lodge. He was a keen angler, and many of his holidays were spent fishing in Wales and in Ireland. He was a founder member of the Hastings Flyfishers Club, and was president of the club at the time of his death. "Tom" Reed will long be remembered by his colleagues for his quiet friendliness and loyalty and by his patients for his unfailing kindness, sympathy, and good humour. He was deservedly popular and will be greatly missed. Much sympathy will be felt for his widow and for his son, Dr. Brian Reed.—E. A. P.

Dr. CEDRIC WHITFIELD ARMSTRONG died at Danby, Yorks, on Feb. 12, at the age of 65. Dr. Danby was a student at the London Hospital, and qualified in 1917. In his remote rural practice in the Yorkshire hills and dales, versatility and self-reliance were required. Consultant and hospital services were twenty miles away, and there was much minor surgery to be done. His patients' homes sometimes lay at the end of a long path over moors and cart-tracks, and the distances were such that visits to three patients might well mean a rushed and busy day—with winter snowdrifts, almost an impossible day. Dr. Armstrong was keen on sport, and he helped the tennis, cricket, and badminton clubs which mean so much to the social life of a rural community. He cared little for money, and was glad when the National Health Service Act, which he thought "a good thing for the rural doctor," relieved him of the necessity of collecting accounts. Like everyone, he had his faults, but he had courage, not only in the way he faced many years ago an operation (which proved successful) for a malignant condition, but in the way in which he would stand up for the "medical" rights of a humble labourer against pressure from influential people. In these and other ways he did a good job as a country doctor.—J. L. B.

Dr. WILLIAM EDWARD HADDEN died at his home in Portadown on Feb. 12, at the age of 90. He had been in failing health for about eighteen months. The youngest son of Dr. David Hadden, of Skibbereen, Co. Cork, he studied medicine in Queen's College, Cork, a constituent college of the Old Queen's University of Ireland, where he was the first scholar in medicine for two years and prosector and assistant demonstrator in anatomy. He was also Peel Exhibitioner and first honourman in Queen's University. This university was dissolved and the Royal University of Ireland took its place, conferring its first degrees in July, 1882, when Dr. Hadden graduated. He took the M.A.O. in 1885. Later the Royal University was dissolved and its place was taken by the National University of Ireland in Dublin, and the Queen's University in Belfast, Dr. Hadden electing to be transferred to the latter university, of which he was the oldest graduate. After a period of dispensary work in Liverpool, a term as a ship surgeon on the S.S. *Sarina*, and assistantships in Durham and York, he went into practice in Portadown in 1886 and continued in active work there until 1930. Dr. Hadden was an ex-chairman of the Portadown and West Down Division of the B.M.A. In his long life he saw the acceptance and general application of many of the great discoveries which have revolutionized the practice of medicine. He kept abreast of the latest knowledge and gave of his best to all his patients. His hobby was gardening, and he was greatly gratified when the late Mr. Sam McGredy, of the famous rose-growing firm, called one of his new roses after him. Dr. Hadden married Rachel, the youngest daughter of Mr. Hamilton Robb, of Edenderry House, Portadown. They had four children, all of whom entered the medical profession; two of them, Dr. Winifred E. Hadden and Dr. Robert E. Hadden, and three grandchildren, survive him. Four of Dr. Hadden's five brothers were doctors, and by 1936 there were twenty-seven doctors among the descendants of his grandfather, the Rev. John Hadden.

Dr. CHARLES NUGENT CHADBORN, who died on Feb. 18, was for many years a well-known figure in Brighton. After three years as senior house-surgeon at the Royal Sussex County Hospital he was appointed anaesthetist to the hospital in 1904, and held this post until ill health necessitated his retirement some twelve years ago. He was an expert in this special field, and a safe and trusted colleague. At the hospital he was known to all as "Chaddie." His dry humour, enhanced by a stammer which he never completely overcame, and his witty and fearless sallies, often at the expense of his colleagues and chiefs, were a constant source of delight to his hearers. Chadborn served in the 1914–18 war with the 2nd Eastern Hospital, with the 55th General Hospital in France, and later at Vogera in Italy. He was a bachelor, with a warm place in his heart for children. He cultivated various hobbies, at one time rose-growing, at another pigeon-breeding, in which he was a successful exhibitor at many shows. In his student days he played rugby for his hospital, St. George's, where he qualified in 1898, and as a golfer he was nearly a scratch player. His last years were clouded by illness, and when the end came it was a merciful one. He leaves behind him friends who will keep in remembrance a warm-hearted and whimsical colleague, whose shafts of wit were never barbed and whose contribution to the gaiety of his time was no small one.—H. N. F.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

Dr. Matthew Bennett, assistant director of the radiotherapeutic centre, Addenbrooke's Hospital, will deliver a lecture on "The Treatment of Malignant Melanoma" in the Department of Pathology on Wednesday, May 4, at 4.30 p.m. The lecture is open to members of the University and to the public without fee.

Dr. L. C. Martin has been appointed liaison officer to the United Cambridge Hospitals until Sept. 30, in the room of the late Dr. F. B. Parsons.

On Feb. 26 the degree of M.A. was conferred on Sir Alan Filmer Rook, senior health service officer of the University Health Service.

The following medical degrees were conferred on Feb. 26:

M.D.—C. H. Hoskyn, D. G. R. Fox.

M.B., B.CHIR.—*W. I. N. Kessel, *R. V. Grange, *T. C. Langdon, *D. M. Phear, J. E. Naylor, P. C. J. Nicholl, M. I. M. Pines.

* By proxy.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

At a meeting of the College held on Feb. 4, the following were admitted to the Membership: T. D. Hanratty, R. W. M. Strain, F. G. C. Walker.

Medical Notes in Parliament

ANALGESIA IN CHILDBIRTH

The second reading of the Analgesia in Childbirth Bill was moved on March 4 by Mr. PETER THORNEYCROFT. He said the Bill was supported by members of all parties. The National Association of Midwives and other organizations of women were solidly behind the proposals. The problem had always been to find a safe way of administering analgesia to a woman in her own home and with a midwife present. The gas-and-air machine was safe and effective. The new drug, pethidine, was still on the dangerous drugs list. Trilene was also a drug about which much had been written. The Bill did not try to discover which device was best, but it was necessary whatever method was adopted. It was necessary to have midwives trained and apparatus supplied and transported to the home of the mother. An overwhelming number of women in this country who had babies desired some form of relief in childbirth. He did not think that Parliament could ensure painless childbirth all over the country, but it could do a great deal to relieve the worst pain suffered at present. He paid tribute to the work already done in this field by Dr. Minnitt, who invented the gas-and-air machine, and by Dr. Elam, of the Wellhouse Hospital at Barnet. The Bill proposed that within four years all midwives should be trained in the administration of some form of analgesia. It imposed a duty on local authorities to supply the apparatus and the drugs and the necessary transport to get both midwife and apparatus to the patient. It imposed a duty on all hospitals, public or private, to have the apparatus available for use in working order. Of 17,000 midwives in practice, 7,000 had no training in the administration of analgesia. The Bill provided that under the Central Midwives Board every midwife should within four years have received some training. The Central Midwives Board thought that could be done within four years.

It was already within the power of the local health authority to supply apparatus, drugs, and transport. The best authorities already did this. Yet there were local authorities which allowed neither a car nor a car allowance to midwives. They ought not to have local option in this sort of thing. If the mother desired analgesia the apparatus should be available. Hospitals should have a duty to ensure that the apparatus was available and a duty to maintain it in working order. Dr. Elam had declared that a weekly visit should be made by a staff anaesthetist to the labour wards to examine carefully all gas-and-air or trilene machines.

Mrs. LEAH MANNING said Parliament had done much to prepare women for childbirth by looking after health and nutrition. The best psychological preparation was for a woman to know that, if she wished, she could have her baby without pain.

Medical Views

Dr. HADEN GUEST said the most important part of the Bill was the provision that all midwives should be trained in the giving of analgesia. Mr. Thorneycroft had got the subject a little out of focus, but informed medical opinion was behind him. The Bill would raise the status of midwives and get more recruits to the profession. If they could get midwives better trained, they could improve the conditions of maternity far beyond anything thought possible twenty years ago. He doubted, however, whether this duty should be imposed on local health authorities under a Private Member's Bill. Dr. Guest did not believe that fear of pain in childbirth prevented the increase in the population. In all countries, as the standard of living went up, the birth rate went down.

Dr. STEPHEN TAYLOR said in midwifery pain had been relatively neglected by doctors because any anaesthetic stopped muscular contraction. Doctors wished to see gas-and-air applied in every case, but the House must not run away with the idea that it would give anything like complete relief. In 1938 only 500 midwives had been trained in the use of analgesia. In 1947 the corresponding figure was 7,000. At this rate of progress all those midwives remaining to be trained would have been trained in four years. The Bill was unnecessary in that respect. In one year the Government had doubled the number of mothers receiving analgesia—27,000 in 1946–7 and 43,000 in 1947–8. He hoped the latest figure would show that the total had been doubled again. The Ministry had full compulsory powers since the passing of the National Health Service Act. Stitching up after delivery required full anaesthesia, and it was a disgrace that some doctors still used the barbarous practice of not giving an anaesthetic for it. That practice, however, would not be ended by the Bill. He pointed out that of the women, all doctors, who were reported on in the Medical Women's Federation inquiry, 96 had gas-and-air (*Journal*, Feb. 26, p. 333). Of these, 33 were completely satisfied, 40 found it useful, and 23 said it was useless. There would always be a proportion of mothers who got no relief from the apparatus. It was not a perfect machine, but pending the perfect machine the House wanted every woman to have this other machine. However, it could be obtained under the National Health Service without this additional Bill. Relief of pain was the second priority in the midwifery service. The first was the safety of mother and child.

Dr. SEGAL said it had yet to be proved that analgesics—not anaesthetics—properly administered had the slightest effect in retarding the power of muscular contraction. In the Medical Women's Federation inquiry the replies of 196 women showed that in 14% of normal confinements of women doctors and in 25% of abnormal confinements a second confinement was dreaded. This was in what the *British Medical Journal* in a leading article (Feb. 26, p. 356) had described as a privileged section of the community. No less than 92% of these medical women thought that analgesia was necessary in their confinement. When this report asked whether obstetricians were disinterested in obstetric analgesia, the House should ask to what extent the general practitioner, harassed with a heavy round of other patients to visit, was disinterested in administering analgesia in an obstetric case, knowing that the more analgesia he administered the longer the confinement might take. When a doctor was not pressed for time and could concentrate on the case in hand nothing gave him deeper satisfaction than the knowledge that he had delivered a woman with as near a complete absence of pain as possible. He wished doctors were so numerous that they could devote to every confinement the degree of patience and care needed in the interests of the mother and the child. Every doctor realized what an enormous amount of research work still had to be done on analgesia, but that was no excuse for neglecting to administer some form of analgesia under proper safeguards. There was no excuse for the Government not giving full support to the Bill.

Government Reply

Mr. BLENKINSOP, replying for the Government, said the only difficulty was whether this Bill was the way in which provision should be made for relief of pain in childbirth. This matter transcended any Party view. Most of the debate had been on the desire for a wider provision and not on whether the Bill was the instrument one would use to secure the wider provision. Through the operation of the National Health Service they were making rapid and encouraging progress in dealing with the matter, and through greater use of the Service they would find a solution to the problems which had been raised in the debate. The Ministry had tried during the last twelve months to ensure a wider use of analgesics. Just before the National Health Service came into operation Mr. Bevan had made it clear to local health authorities that they must ensure that all domiciliary midwives were trained as rapidly as possible, that apparatus should be fully available, as also proper facilities for transport. The main development and drive had come since 1946. For those who were to do this work there were now 230 training institutions. There were district schemes in 49 counties and county boroughs. From Jan. 1, 1948, all new midwifery pupils were trained.

In London at the end of last year 148 out of the Council's 155 midwives were trained and qualified. In December, 1948, analgesia was given to 60% of the cases in the domiciliary service, as against 3% in 1936. The Government wished to ensure that all other authorities were raised to the level of London, which was effectively tackling the problem. He hoped it would have the co-operation of everyone in the House in solving the problems which were holding up developments. Above all, the Government wished to ensure that the transport problem was handled effectively. The present analgesic apparatus—he stressed "present"—was heavy and cumbersome. It had been impressed on local authorities that they must regard provision of transport for midwives for this purpose as being of the utmost priority. The Government had made special arrangements with the manufacturers of motor-cars to ensure that cars got to the midwives—midwives being treated as doctors were treated. The Government did not believe that the Bill could bring a single extra car or relief for a single extra patient. Frankly, he could not see the value of the Bill. He felt it was superfluous. He did not think it was a good way to develop the National Health Service if they made it a specific duty to take one element of the Service out of consideration of the rest of the Service. By isolating particular portions of the Service and providing special statutory provisions for this or that element the conception of the National Health Service as a whole was likely to be wrecked. During the operation of the Service in the past year enormous progress

had been made. The Government welcomed the day's discussion, but he did not see why it was necessary to bring in this Bill.

The Bill was read a second time without a division and was sent to a Standing Committee.

Practitioners with Limited Lists

Sir ROBERT YOUNG asked on Feb. 17 when information was likely to be given regarding the payment of basic salary for those doctors undertaking general medical services for the staffs of institutions.

Mr. BEVAN replied that the adjustment of remuneration of practitioners with limited lists was among the matters to be dealt with in the distribution scheme which he was about to discuss with the profession. The consultations would be at an early date.

Shortage of X-ray Film

Mr. MAUDE raised on Feb. 22 the question of the shortage of supplies of *x*-ray film.

Mr. JOHN EDWARDS replied for the Board of Trade. He said that even before the introduction of the National Health Service the demands of the hospitals had increased. Till the middle of last year, production of *x*-ray films was in general up to demand, but even before the new Health Service production was reaching saturation point and there was bound to be a shortage unless new manufacturing capacity was created. Last September the annual increase in demand had risen from the normal 15% to between 20 and 25%, and seemed likely to go up to 30%. The Board of Trade, the Ministry of Health, and the manufacturers consulted to see what could be done, and it was agreed to reduce exports from 45% to 40%, the proportion to be reviewed again next June. Plans were pressed forward for expanding the capacity of the biggest manufacturer, but it was unlikely that buildings and machinery would be completed for eighteen months to two years.

There was a world shortage of *x*-ray film, and even in the United States supplies to hospitals had to be rationed. *X*-ray film could be sold readily in any market of the world, and the decision to reduce exports by 5% was a considerable economic sacrifice. Demand for *x*-ray film in 1948 showed an increase over the whole year of about 24% over 1947. Production had risen by approximately 14%. It was now estimated that the demand for 1949 would be 30% above that of 1948, but output should be approximately 27% above 1948. It was desirable that those who had to make decisions on the use of *x*-ray film should if their supplies did not meet all their requirements put really urgent cases before less urgent ones. He himself was not wholly satisfied that the utmost economy was being effected, and he appealed for it to all hospitals, doctors, dentists, and everyone who used these materials.

Exchange Control Medical Advisory Committee

COLONEL STODDART-SCOTT on March 2 asked how many medical members were on the Exchange Control Medical Advisory Committee; how many times this committee met in the year 1948; and how many were present at each meeting.

Mr. GLENVIL HALL replied that there were ten medical members exclusive of the secretary and the Treasury medical adviser. There were no non-medical members. The full committee met five times, the numbers present being respectively 10, 9, 10, 11, and 10. In addition, each application was submitted to two members of the committee and, if necessary, to the chairman as well. Members met informally at frequent intervals for consultation about cases. Each member of the committee received an honorarium of £500 per annum in respect of all services. The total cost in 1948 was about £6,500. Applications for foreign currency from January to December, 1948, numbered 2,907, of which 914 were refused.

There were 101 applications in respect of cases of tuberculosis which were refused in the fourteen months ended Feb. 14 last. The corresponding approvals over the same period were 1,009.

Grants to Universities

Sir ERNEST GRAHAM-LITTLE asked whether the Chancellor of the Exchequer could make a statement regarding the grant to universities which he proposed to make in the forthcoming Budget.

Sir STAFFORD CRIPPS replied on March 1 that he was providing £12,814,500 for recurrent grants to universities. This amount included provision for the additional expenditure which universities would incur in bringing into operation the revised scales of payment for teachers in the medical and dental schools. (See annotation, March 5, p. 403.) Sir Stafford added that the progress of the universities' scheme for physical expansion necessitated an increase in the amount required for non-recurrent grants. He was providing £4,750,000 for this purpose as against £2,600,000 this year.

No. 7

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Feb. 19.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included), (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each Infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1949					1948 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	37	3	24	3	2	36	3	15	3	—
Deaths		—	—				—	—		
Diphtheria	112	10	30	9	4	180	20	59	13	5
Deaths	3	—	—	—	—	3	2	1	—	—
Dysentery	104	29	33	1	1	191	19	63	—	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	—	—	—	—	—	1	—	—	—	—
Deaths		—					—			
Erysipelas			37	9	7			51	9	4
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				38					15	
Deaths	41	5	8	1	3	48	7	13	5	1
Measles*	19,502	777	134	151	149	7,209	766	848	82	19
Deaths†			1	—	—			—	—	—
Ophthalmia neonatorum	45	3	12	—	—	79	4	12	1	—
Deaths										
Paratyphoid fever	9	1	6 (B)	—	—	3	—	3 (B)	—	1 (B)
Deaths	—	—	—	—	—	—	—	—	—	—
Pneumonia, influenzal	1,469	119	62	18	22	788	39	15	9	2
Deaths (from influenza)‡	158	33	21	—	—	28	4	2	—	—
Pneumonia, primary			358	49				224	40	
Deaths	422	104		9	20	221	29		9	6
Polio-encephalitis, acute	1	—				3	—			
Deaths										
Poliomyelitis, acute	19	1	1	1	—	27	3	6	2	—
Deaths§	1	—				3	—			
Puerperal fever		—	4				3	8		—
Deaths										
Puerperal pyrexia‖	121	12	8	—	2	86	8	13	—	—
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,333	77	204	115	43	1,828	118	327	44	36
Deaths†			—	—	—			1	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	3	—	—	3	—	1	—	1	6	—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	3,027	191	259	63	67	2,552	155	55	55	11
Deaths	16	—	1	3	—	—	1	1	1	—
Deaths (0–1 year)	387	46	57	22	21	355	37	51	17	1
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	6,992	1324	771	220	161	4,801	731	617	167	131
Annual death rate (per 1,000 persons living)			15·5	13·6				12·5	10·4	
Live births	8,069	1299	901	424	222	7,964	1216	998	373	270
Annual rate per 1,000 persons living			18·1	26·3				20·1	23·3	
Stillbirths	202	28	21			215	32	26		
Rate per 1,000 total births (including stillborn)			23					25		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Deaths from measles and scarlet fever for England and Wales, London (administrative county), will no longer be published.

‡ Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

§ The number of deaths from poliomyelitis and polio-encephalitis for England and Wales, London (administrative county), are combined.

‖ Includes puerperal fever for England and Wales, Eire, and Northern Ireland.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* increases were reported in the notifications of measles 1,061, acute pneumonia 330, and dysentery 36, and there were decreases in the incidence of scarlet fever 84 and diphtheria 36.

The largest rises in the notifications of measles were Surrey 259, Essex 202, Nottinghamshire 190, and Yorkshire West Riding 149; the largest falls were Lancashire 97 and Somerset 87. The returns for scarlet fever showed only small variations; there were decreases in Lancashire 44 and London 27 and an increase in Yorkshire West Riding 18. The only variation of any size in the incidence of whooping-cough was a decrease of 52 in Warwickshire.

A small decrease in the notifications of diphtheria was reported throughout the country; the largest fall was 9 in Yorkshire West Riding. Of the 112 cases of diphtheria 74 were notified in five counties: Lancashire 32 (Liverpool C.B. 15); Durham 12; London 10; Cheshire 10; and Yorkshire West Riding 10. The rise in the incidence of pneumonia tended to be slightly larger in the northern section of the country than in the south; the largest rise was Lancashire 85.

A new outbreak of dysentery, affecting 9 persons, was notified from Surrey, Banstead U.D. Increases in the notifications of dysentery were reported in London 13 and Lancashire 20. The chief centres of infection in London were Islington 13 and Wandsworth 10, and in Lancashire they were Liverpool C.B. 14 and Oldham 11. The only counties with more than one notification of acute poliomyelitis were Buckinghamshire 3 (Slough M.B. 2) and Yorkshire West Riding 2.

In *Scotland* there were decreases in the notifications of scarlet fever 64 and acute primary pneumonia 33, and there were increases in the incidence of measles 23, whooping-cough 20, and dysentery 14. A small fall in the incidence of scarlet fever was recorded throughout the country. The increase in the incidence of dysentery was due to the outbreak in Edinburgh, where the notifications rose from 3 to 22.

In *Eire* rises were recorded in the notifications of measles 28 and diarrhoea and enteritis 11. There was a decrease of 24 in the incidence of whooping-cough.

In *Northern Ireland* the totals differed only slightly from those of the preceding week. In the case of measles, increases in Antrim of 11 and in County Down of 13 were offset by a decrease of 14 in Tyrone.

Yellow Fever in Panama

On Jan. 15 the Pan-American Sanitary Bureau was informed of 8 cases of jungle yellow fever with 6 deaths near the town of Pacora, situated some 25 miles from Panama City, 16 miles east of the Panama Canal and 10 miles north of the Pacific Coast. No new cases have been notified since the last death on Dec. 30, 1948.

According to information provided by the Director of the Pan-American Sanitary Bureau, the fatal cases are classified epidemiologically as typical jungle yellow fever. There were four in workers who were engaged in cutting timber in the forest, and one in a person who had spent a week hunting in the same jungle area of Panama. The cases, diagnosed at necropsy, occurred between the beginning of November and the end of December, 1948, all in the vicinity of the town of Pacora, where there is no *Aedes aegypti*, since, among other reasons, this area had previously been sprayed with D.D.T. in the course of the antimalaria programme carried out in Panama under the supervision of the National Department of Health.

The measures recommended by the Pan-American Sanitary Bureau are: intensification of the *Aedes aegypti* eradication programme; vaccination of susceptible persons exposed to the disease (150,000 persons have already been vaccinated in the region of Pacora and adjacent areas); and vaccination of residents of those areas when they move elsewhere. In the opinion of the Bureau there is no danger from persons who are simply in transit through cities without *Aedes aegypti*.

It is stated that no clinical case of urban yellow fever has occurred in Panama for fifty years, and until the present outbreak no human cases of jungle yellow fever had been diagnosed there.

Influenza

There were 251 deaths from influenza in the great towns in the week ending Feb. 26, as compared with 159 the previous week. Deaths were fairly evenly distributed throughout the country but with a slight preponderance in the north-east (Sunderland 12, South Shields 6) and in the north-west. Greater London had 98 deaths compared with 85 in the previous week.

Future Births

The final estimate of live births to be expected in England and Wales during the March quarter, made by the Registrar-General from a knowledge of the number of special ration books issued to expectant mothers and having regard to the present trend of live births, is 181,100. A provisional estimate for the June quarter is 184,900 births. Both these figures are approximately 20,000 below the number of live births for the corresponding quarters of last year.

Vital Statistics for Scotland, 1948

A preliminary statement by the Registrar-General for Scotland shows that the birth rate for 1948 was 19.4 per 1,000, which was 0.2 above the average of the five preceding years. The infant mortality was 45 per 1,000 live births, and was the lowest rate ever recorded in Scotland, being 9 below the previous lowest rate in 1946. The maternal mortality of 1.5 per 1,000 total births was also the lowest rate ever recorded. This rate is only one-quarter of that of twenty-two years ago, and is only about half the rate experienced as recently as 1944. The general death rate at 11.8 per 1,000, the lowest death rate ever recorded in Scotland, was 0.8 below the average for 1943–7. The death rate for all forms of tuberculosis was 76 per 100,000, and for respiratory tuberculosis 66. These rates were respectively 1 below and 6 above the average of the five preceding years.

Week Ending February 26

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,262, whooping-cough 3,045, diphtheria 119, measles 20,055, acute pneumonia 1,607, cerebrospinal fever 46, acute poliomyelitis 10, dysentery 79, paratyphoid 7, and typhoid 4.

Medical News

Lord Webb-Johnson

Lord Webb-Johnson has been appointed a Deputy Lieutenant for the County of London.

Parliamentary Scientific Committee

Sir Robert Robinson, President of the Royal Society, has been elected Honorary Member of the Parliamentary Scientific Committee.

British Council Lectures in Italy

Professor R. A. Peters, F.R.S., Whitley Professor of Biochemistry in the University of Oxford, went to Italy recently to lecture for the British Council in Milan, Pavia, Padua, Bologna, Rome, and Naples. He is speaking in Italian to biochemists and medical graduates on "Biochemical Lesions and their Meaning" and "Biochemical Lesions in Arsenical Poisoning and BAL." His tour ends on March 25.

Medical Delegation to Poland

Five medical men left for Poland on March 11 under an exchange scheme organized by the British Council and the Polish Ministry of Health. Members of the delegation are Professor W. J. B. Riddell, Professor of Ophthalmology in the University of Glasgow; Professor D. M. Dunlop, Professor of Therapeutics and Clinical Medicine in the University of Edinburgh; Dr. G. S. Wilson, Director of the Public Health Laboratory Service; Dr. Marc Daniels, member of the Medical Research Council and secretary of the streptomycin trials; and Mr. G. H. MacNab, surgeon to the Hospital for Sick Children, Great Ormond Street, and dean of the Westminster Hospital Medical School. Most of their time will be devoted to a tour of inspection and observation, but each delegate will give at least one lecture. The first part of the exchange took place between Jan. 30 and Feb. 11, when five Polish medical men visited London and the provinces. The British delegation will complete their tour on March 24, after which Professor Riddell will lecture for the British Council in Prague.

French Academy of Medicine

Mr. Hugh Linstead, M.P., who is secretary of the Pharmaceutical Society of Great Britain and chairman of the Wandsworth Hospital Group, has been elected a foreign corresponding member of the Academy of Medicine of France.

Health and Tuberculosis Conference

The Minister of Health has sanctioned on certain terms payment of delegate's expenses for attending the 2nd Commonwealth and Empire Health and Tuberculosis Conference organized by the N.A.P.T. Information may be obtained from the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1.

Broadcast for Lost Drugs

In response to the Pharmaceutichl Society's request that they should not broadcast the names of lost drugs the B.B.C. has decided to discontinue altogether the broadcasting of police messages about lost or stolen drugs within the Metropolitan police district. Cases in which danger to life is believed to exist will be excepted, and also those in which drugs or poisons have been purchased in mistake for some harmless medicine. The Society's objection was based on the fact that the name of the drug might disclose the doctor's treatment to the patient and also that the repetition of words like "phenobarbitone" made less responsible listeners regard such drugs as a joke.

COMING EVENTS

Informing the Public

The Public Health Department of the Middlesex County Council (10, Great George Street, London, S.W.) has arranged a symposium on "The Principles and Technique of Informing the Public" to be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., on Monday, March 14. The programme is as follows: 10 a.m., Dr. W. Hartston, "The Tactics and Strategy of Health Education"; 10.30 a.m., Mr. A. A. McLoughlin, "On Approaching the Public"; 11 a.m., Dr. Charles Hill, "The Spoken Word"; 12 noon, Mr. Macdonald Hastings, "The Written Word"; 2.30 p.m., Mr. K. Lockhart Smith, "The Visual (Film) Approach"; 3.30 p.m. Mr. R. W. King, "Telling the World"; 4.15 p.m., open discussion on "Health Education."

Faculty of Anaesthetists

The annual general meeting of the Faculty of Anaesthetists of the Royal College of Surgeons of England will be held at the College (Lincoln's Inn Fields, London, W.C.) on Wednesday, March 16, at 3.40 p.m.; at 5 p.m. the Joseph Clover Memorial Lecture entitled "Joseph Clover, His Life and Achievements" will be delivered by the Dean of the Faculty, Mr. A. D. Marston; and at 8 p.m. the first annual dinner of the Faculty will be held.

Cancellation of Lecture

The Dean of the National Hospital, Queen Square, London, W.C., has announced that, owing to the illness of Professor J. Lhermitte, the lecture on "Visual Hallucinations" which was to have been given on March 17 has been cancelled.

Discover Bethnal Green

A "Discover Your Neighbour" course will be held at Oxford House and University House on March 22–April 13. Those taking part study the home life and problems of the people of Bethnal Green as well as its history, geography, and institutions. Particulars may be obtained from Mr. G. A. McCarthy, Oxford House, Mape Street, Bethnal Green, London, E.2. The fee is 3 guineas a course; board, £2 10s. a week.

Institute of Almoners

The annual general meeting of the Institute of Almoners will be held at the Central Hall, Westminster, London, S.W., on Friday, March 25, at 6.30 p.m., when Dr. John B. Grant, Director for Europe, International Health Division, the Rockefeller Foundation, will deliver an address.

Association of Medical Illustrators

A meeting for actively engaged medical and surgical artists will be held at the Radcliffe Infirmary, Oxford, on Saturday, April 2, at 12 p.m., in order to form an Association of Medical Illustrators. The Association is being formed to maintain and improve the standard of medical illustration in this country, to further the use of art in medical science, and for the mutual benefit of members and the encouragement of young artists who wish to specialize in medical illustration. Artists who are interested should write to the provisional honorary secretary, Mrs. Zita Stead Blackburn, 19, York Avenue, East Sheen, London, S.W.14.

SOCIETIES AND LECTURES

Monday

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, London, W.—March 14, 8.30 p.m. *"Electroencephalography,"* by Dr. D. J. Williams; *"Warts,"* by Dr. Isaac Muende.

Tuesday

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, London, W.C.—March 15, 5 p.m. *"Cutaneous Syphilis,"* by Dr. A. C. Roxburgh.

LONDON: UNIVERSITY COLLEGE.—At Physiology Theatre, Gower Street, London, W.C., March 15, 5.15 p.m. *"Integration of Activity of Reflexogenic Areas,"* by Dr. A. Schweitzer.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W., March 15, 5 p.m. *"The Syndrome of Diabetes Mellitus,"* Oliver-Sharpey Lecture by Professor H. P. Himsworth.

ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, London, W.—March 15, 5.15 p.m. *"The Chemical Characterization of Fission Products,"* by Professor H. J. Emeleus, D.Sc., F.R.S.

Wednesday

HARVEIAN SOCIETY OF LONDON.—At 26, Portland Place, London, W., March 16, 8.15 p.m. *"Some Common Diseases of the Rectum and Anus,"* by Mr. W. B. Gabriel.

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, London, W.C.—March 16, 5 p.m. *"X-ray Technique,"* by Dr. C. W. McKenny.

MIDDLESEX COUNTY MEDICAL SOCIETY.—At Ashford Hospital, London Road, Ashford, Middlesex, March 16, 3 p.m., General meeting. 5 p.m., *"Angiocardiography in the Diagnosis of Congenital Heart Disease,"* by Drs. J. A. Brocklebank and K. D. Keele.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, London, W.C.—March 16, 5 p.m. *"Joseph Clover, His Life and Achievements."* Joseph Clover Lecture by Mr. A. D. Marston.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh.—March 16, Annual Extraordinary General Meeting.

ROYAL MICROSCOPICAL SOCIETY, B.M.A. House, Tavistock Square, London, W.C.—March 16, 5.30 p.m. *"The Electron Microscopy of Animal Viruses,"* by Dr. I. M. Dawson.

Thursday

EDINBURGH CLINICAL CLUB.—At B.M.A. Scottish House, 7, Drumsheugh Gardens, Edinburgh, March 17, 8 p.m. *"The Home Treatment of Rheumatoid Arthritis,"* by Dr. J. G. Sclater.

LONDON UNIVERSITY.—At Large Lecture Theatre, St. George's Hospital Medical School, Hyde Park Corner, London, S.W., March 17, 4.30 p.m. Lecture-demonstration: *"Psychiatry."*

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W., March 17, 5 p.m. *"The Syndrome of Diabetes Mellitus,"* Oliver Sharpey Lecture by Professor H. P. Himsworth.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At Royal Army Medical College, Millbank, London, S.W., March 17, 7.30 p.m. Laboratory meeting. Various demonstrations will be given.

Friday

LONDON CHEST HOSPITAL, Victoria Park, E.—March 18. *"Acute Pericarditis,"* by Dr. J. Browning Alexander.

ROYAL INSTITUTE OF PHILOSOPHY.—At University Hall, 14, Gordon Square, London, W.C., March 18, 5.15 p.m. *"The Life of Reason,"* by Professor C. A. Campbell.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.—At South Kensington Hotel, 41, Queen's Gate Terrace, London, S.W., March 18, 7.15 p.m. for 7.30 p.m. Dinner meeting. *"Foul Play,"* by Dr. Keith Simpson.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

Clark.—On Feb. 25, 1949, at Hargreaves Head, Northowram, Halifax, to Margaret (née Watkinson), wife of Mr. T. L. Clark, M.D., F.R.C.S., a daughter.

Gibson.—On Feb. 26, 1949, to Dr. Margaret G. Gibson (née Calwell), wife of Dr. S. Gibson, 10, Heald Street, Garston, Liverpool, twin daughters.

Jennings.—On Feb. 27, 1949, at Shoreham-by-Sea, to Faye, wife of George Jennings, F.R.C.S., a daughter.

Lacey.—On March 4, 1949, at Connaught Nursing Home, Cardiff, to Dr. Gaynor Nash Lacey (née Jones), wife of the late Dr. Charles E. Lacey, a son.

Pezeshgi.—On Dec. 23, 1948, at Avenue Shah Reza, Teheran, to Elizabeth (née Jones, of Sussex), wife of Dr. H. Pezeshgi, a daughter—Djalililah Sadry.

Stallard.—To Molly (née Murray), wife of Dr. A. F. Stallard, Hereford, a daughter.

Trent.—On March 2, 1949, at Bearstead Memorial Hospital, London, N., to Muriel, wife of Dr. J. L. Trent, of 7, Hylda Court, St. Albans Road, London, N.W., a daughter—Pamela Susan.

Veall.—On Feb. 12, 1949, at Holmwood, Cowes, to Muriel Veall, M.B., B.S. (née Burgess), and Capt. R. M. Veall, Elmhurst, Mayfield Road, E. Clowes, a daughter.

Wall-Clarke.—On March 1, 1949, to Marjorie (née Roughley), wife of J. G. Wall-Clarke, M.R.C.S., L.R.C.P., Brooklands, Kiln Lane, St. Helens, a son—David John.

Wear.—On March 1, 1949, at Bristol, to Eileen (née Cole), wife of Dr. A. R. Wear, a daughter—Jean Helen.

DEATHS

Clowes.—On Feb. 25, 1949, Norton Burroughs Clowes, M.R.C.S., L.R.C.P.

Cockcroft.—On Feb. 24, 1949, at Toby Cottage, Middleham, Yorks, George Cockcroft, M.B., B.S., aged 66.

Green.—On Feb. 23, 1949, at 356, London Road, Portsmouth, John Hugh Cuthbert Green, M.B., Ch.B.

Hadden.—On Feb. 12, 1949, at Magharee, Portadown, N. Ireland, William Edward Hadden, M.D., M.Ch., M.A.O., aged 90.

Keigwin.—On Jan. 27, 1949, at Durban, George John Williams Keigwin, L.R.C.P.&S.Ed., L.R.F.P.S.Glas., late West African Medical Service.

Lyon.—On Feb. 25, 1949, at Brighton, James Malcolm Lyon, M.B., C.M., of 14, Wilbury Crescent, Hove, aged 83.

Martyn.—On March 1, 1949, at Quantock Lodge, Bridgwater, Somerset, Valentine Cleeve Martyn, M.C., M.R.C.S., L.R.C.P., aged 64.

Whalley.—Recently, Edgar Whalley, M.R.C.S., L.R.C.P., of Park View Crescent, Roundhay, Leeds, aged 74.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Convulsions

Q.—*What are the modern views on the cause of convulsions in babies, and also (a) the present-day treatment during the convulsion; (b) after-treatment to prevent further convulsions, and any investigations that are indicated; and (c) the prognosis?*

A.—Despite electroencephalography and biochemical advances there is not much that can be described as modern regarding convulsions in babies. Treatment during the convulsion is seldom in medical hands. The traditional hot bath gives the mother something to do. A doctor could give a sedative at once, such as an injection of phenobarbitone soluble (¼ gr. (16 mg.) for a baby of 3 months). Chloroform anaesthesia is rather frowned upon, and other forms of inhalation anaesthesia are mostly ruled out by practical difficulties. After-treatment consists in keeping the baby under the influence of sedatives—such as chloral and bromide, 1 to 2 gr. (65 to 130 mg.) of each four-hourly—for several days. Investigations should include consideration of the state of digestion (with a rectal wash-out, and even gastric lavage with normal saline, if diarrhoea and vomiting exist), of the state of the throat and ears, and of the urine. Evidence of the onset of an acute infection may be found, or an early pneumonia, although it may be several days before the obvious type of infection is clearly revealed. Rickets—although very rare nowadays—should be thought of as an underlying cause of convulsions and a suitable dosage of vitamin D arranged. Disease of the central nervous system must clearly be looked for. Any suspicion of a bulging fontanelle or of neck stiffness should lead to the performance of a lumbar puncture. Views on prognosis have not changed in recent times. Provided that no obvious underlying or exciting cause is found, the prognosis should be guarded, as in a small proportion of epileptics the fits date back to infancy. One bout of convulsions, easily controlled, is of little significance; repeated bouts cause anxiety, but only a small number of babies who have convulsions have any residual trouble.

Ballet-dancing

Q.—*There is a recent trend in girls' schools towards including ballet-dancing in the curriculum as a routine subject. Is anything known of the effect of ballet-dancing on young girls' feet?*

A.—There have been many misconceptions concerning the effects ballet-dancing has on the feet. It is true that injuries occur from time to time; but there is little doubt that on the whole the effect is beneficial and that the advantages gained far outweigh the risk of occasional harm. Nevertheless the classes should be under the supervision of a competent dancing mistress who understands the anatomy and physiology of the foot; and in girls under the age of 12 or 13 the amount of dancing done should be very moderate. The beneficial results of ballet-dancing accrue from the powerful development of the intrinsic muscles of the foot and of the calf muscles—structures which are largely responsible for the protection of ligaments and the maintenance of normal bone relationships in the foot. At the same time the general tone and posture of the body as a whole are improved. A foot normal to begin with is unlikely to be altered in shape by a moderate amount of dancing; similarly, a foot that is initially flat is likely to remain flat, but the symptoms will often be improved. Harmful effects are usually due to injury—either a single acute injury or repeated minor strains. Bones, ligaments, muscles, or tendons may be affected; and the anterior part of the foot is especially susceptible owing to the extra strains to which it is subjected. The commonest individual lesions are foot-strain, metatarsalgia, sesamoiditis, fracture of the medial sesamoid of the hallux, avulsion of the base of the fifth metatarsal, bursitis deep to the tendo Achillis, and strains of the calf muscles or adductors of the hip. Such injuries, for the most part, are relatively unimportant and respond readily to rest and treatment; it is only if dancing is performed excessively and injudiciously that structural changes in the feet are to be feared. This is very unlikely to happen in properly conducted classes such as are included in the school curriculum.

Anticoagulant Therapy

Q.—*Could you outline a scheme of treatment of coronary thrombosis with anticoagulants suitable for general as distinct from hospital practice? With the use of heparin, are frequent prothrombin estimations necessary? What is the efficacy of intramuscular injections of heparin as compared with intravenous injections? Is there any simple method of determining the prothrombin concentration in the blood?*

A.—Anticoagulant therapy is a difficult proposition in general practice, chiefly owing to the specialized technique required for prothrombin estimations. There is no simple method whereby the general practitioner can carry out his own tests. He can be of greatest help to his patient by using heparin on his own initiative in suitable cases until a specialist in anticoagulant therapy can be called in to take control of subsequent treatment. To this end heparin may be given in four-hourly doses of 50 mg. intravenously (omitting the night dose) for two or three days. One ml. of the strong solution of heparin contains 5,000 units—equivalent to 50 mg. No tests of blood coagulation are necessary. This dose is likely to keep the clotting-time between 10 and 20 minutes for most of the day. Emergency anticoagulant measures of this kind may be life-saving, but responsibility should be handed over to an expert as soon as possible. It must be clearly understood that dicoumarol therapy is highly dangerous in unskilled hands.

Testing for Food Sensitivity

Q.—*Can you tell me whether the skin tests for sensitivity to foods are regarded as entirely reliable in adults?*

A.—No; skin tests are not regarded as reliable evidence of clinical sensitivity. If fresh extracts of known strength are used, they can be considered reliable tests for the presence or absence of skin-sensitizing antibodies, which may or may not be accompanied by clinical sensitivity. Further, in testing for food sensitivities it must be remembered that in delayed clinical reactions—that is, reactions occurring more than an hour or so after taking the food—one of the breakdown products of the food, and not the food itself, is the allergen: a positive skin test to the undigested food is not to be expected in such cases.

Softening a Toe-nail

Q.—*A patient, who resolutely refuses hospital treatment, has a greatly enlarged and cumbersome great-toe nail. Is there any way to soften this so that it can be more readily cut?*

A.—Soaking in hot water and painting with 12% salicylic acid in spirit would soften the nail. The help of a chiropodist is suggested.

Risk of Contracting Venereal Disease

Q.—*What are the chances of a non-infected person escaping infection after one act of sexual intercourse with a partner suffering from either gonorrhoea or syphilis?*

A.—The answer, of course, is that "it all depends," but one would guess that, broadly speaking, the chances are distinctly better than even. The writer knows of no reliable statistics on the subject nor of any report of experimental trials. It has been stated that it takes a hundred acts of fornication to produce one case of venereal disease (though that would include sexual intercourse with both infected and uninfected persons), and instances are known where several men have had intercourse with the same infected woman and only one of them has contracted venereal disease. As regards either gonorrhoea or syphilis, obviously the more active the disease the greater the chance of its being transmitted: syphilis is highly contagious in the florid secondary stage, less so in the early primary, and probably not at all in the late and latent stages. Similarly, gonorrhoea is most contagious when the discharge is profuse and purulent, and much less so when the disease is more or less confined to, say, the cervical canal.

There is also the question of how the sexual act is performed; if it is protracted there is presumably a greater chance of contagion. It is worth noting that it is difficult to infect a male by experimentally inoculating pus containing gonococci into the urethra, and one venereologist of repute believes that infection occurs owing to pus being sucked into the urethra as a result of a partial vacuum being set up there after ejaculation. The above remarks, of course, are made on the assumption that no precautions are taken before, during, or after the sexual act.

Granuloma Annulare

Q.—*What is the modern treatment of granuloma annulare of the hand?*

A.—Granuloma annulare is not a disease entity but a reaction, an allergic manifestation, and behaves accordingly. There is no specific treatment, but the condition may clear up after biopsy, a fractional dosage of *x* rays, or various local applications. Histologically granuloma annulare is identical with the nodules seen in rheumatoid arthritis, but is of no serious significance. The patient should be investigated to exclude underlying disease, especially a tuberculous infection, which may have provoked the reaction, but a cause will rarely be discovered.

Rectal Bleeding in an Infant

Q.—*A breast-fed baby of 5 weeks is occasionally passing a little red blood per rectum; his haemoglobin is 85% (Sahli). How can iron be best conveyed to him? What investigations are needed and what is the treatment?*

A.—A haemoglobin level is best expressed in grammes per 100 ml., as standards of the Sahli method (as of others) vary. Assuming that this is based on 100% Sahli being equivalent to 14 g. of haemoglobin, then 85% for a 5-weeks-old baby can be regarded as a normal level and not as evidence of anaemia. The need for giving iron therefore does not directly arise, as in fact it very rarely does for a breast-fed baby in the early weeks of life. The rectal bleeding should certainly be investigated: it may be due to a small fissure or a rectal polyp—to name likely conditions—which requires treatment.

Typhoid and Pregnancy

Q.—*Is there any evidence that typhoid has any effect on the germ-plasm? A man and his wife have both had typhoid, and since then two pregnancies have resulted respectively in an early abortion and a monstrosity.*

A.—None. The abortion and the monstrosity have no connexion with the previous typhoid fever in the parents. An attack of typhoid fever in a pregnant woman does frequently cause abortion, but this is a direct effect of the disease on the foetus.

Derris Poisoning

Q.—*What are the signs, symptoms, and treatment of derris-root poisoning? A man employed by a veterinary firm handled a consignment of derris root three weeks ago; he collapsed with intense vomiting, as did three others similarly engaged. He complains of malaise and abdominal discomfort, which he dates from the time of his coming into contact with the derris root; examination reveals nothing definite.*

A.—There is evidence that fish are destroyed within 90 to 240 minutes in a 0.001% aqueous extract of derris. For this reason it is widely used as a fish poison by natives throughout the Tropics. The most common use of derris root, of course, is as an insecticide. A number of chemical compounds, some of them active as insecticides, have been isolated from the fish-poison plants. Of these compounds rotenone seems to be the most important in the case of derris. Animal experiments indicate liver damage on a diet containing derris. In man, however, apart from the irritating effect on mucous membranes and skin, there seems little evidence of the toxicity of this substance. Derris root has been used as an agent for suicide among the natives of New Ireland. In such cases vomiting has occurred before death, and the post-mortem changes were those of acute congestive heart failure. In industry, objectionable effects from derris dust can be overcome by adequate ventilation in grinding departments, and by use of suitable masks during both grinding and the application of sprays and dusts. Treatment would be symptomatic, but it is important that further exposure should be controlled by the measures suggested above.

"Benadryl" and Barbiturates

Q.—*A report is current in Iraq that an antagonism exists between "benadryl" and the barbiturates. If you can confirm this, would you give some indication of the reaction between the two chemicals?*

A.—The only antagonistic reaction between "benadryl" and barbiturates referred to in the literature is that when benadryl is injected intravenously in animals in toxic doses it causes excitement and convulsions; these central effects are prevented by giving a barbiturate 30 to 90 minutes beforehand (Gruhzit and Fisken, *J. Pharmacol.*, 1947, **89**, 227). It is unlikely that this observation has any application to man, since toxic doses of benadryl are not commonly given. In some subjects benadryl causes mental confusion, but there is no evidence that barbiturates affect this. It might be expected, however, that if a barbiturate had been given before the benadryl any confusion produced by the latter would be increased.

Vitamin K and Chilblains

Q.—*Are there any contraindications to the use of vitamin K (recommended as a treatment for chilblains) in patients over 60 or who suffer from arteriosclerosis?*

A.—There are no contraindications to the use of vitamin K in patients over 60, or at any age for that matter, or in patients who suffer from arteriosclerosis. It is a perfectly safe substance. There is insufficient evidence, however, to recommend it for use in the treatment of chilblains.

NOTES AND COMMENTS

Rh Factor and Pregnancy.—Dr. R. N. C. MCCURDY (Ashtead) writes: It is of course impossible to give a complete answer on Rh questions in a small space, but I think that incomplete answers may be misleading. For example, in "Any Questions?" (Jan. 1, p. 42) it is stated that "antibodies are unlikely to be present at five or six months in a first pregnancy, and there is little or no danger to the first foetus from this cause. . . ." It is not pointed out in the answer, nor in Dr. S. A. Doxiadis's note (Jan. 22, p. 164), that there may be considerable danger to a first foetus if such a woman has ever received an injection of Rh-positive blood, however small (Mollison *et al.*, "Rhesus Blood Groups," 1948, M.R.C. Memo No. 19, p. 27), or has previously had an abortion. Under the heading "Repeated Stillbirths" (Jan. 29, p. 206) it is not pointed out that approximately 2% of women developing iso-agglutinins to Rh are themselves Rh-positive and become sensitized to the agglutinogens E or c (Mollison *et al.*, op. cit., p. 19).

Epsom College Centenary Register.—Dr. T. R. THOMSON (Cricklade, Wilts) writes: I have undertaken the general editorship of the *Register* and I am finding great difficulty in tracing the parentage of many of the boys entering the College between 1855 and 1874. I ask readers who have knowledge of these early entrants to write to me. The smallest clue may be useful.

Cholesteatoma.—Dr. MARK HUGHES (Accra, Gold Coast, West Africa) writes: In "Any Questions?" (Jan. 1, p. 41) an inquirer asks, "What are the pathology and treatment of a cholesteatoma?" The answer describes the rare meningeal tumour of that name and quite unaccountably fails to mention the exceedingly common condition of cholesteatoma of the middle ear.

Correction.—In our account of the debate on the Supplementary Estimates for the National Health Service (Feb. 26, p. 372) there was an error. "The cost of the actual individual prescriptions had been greatly increased . . ." should have read "had *not* been greatly increased."

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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